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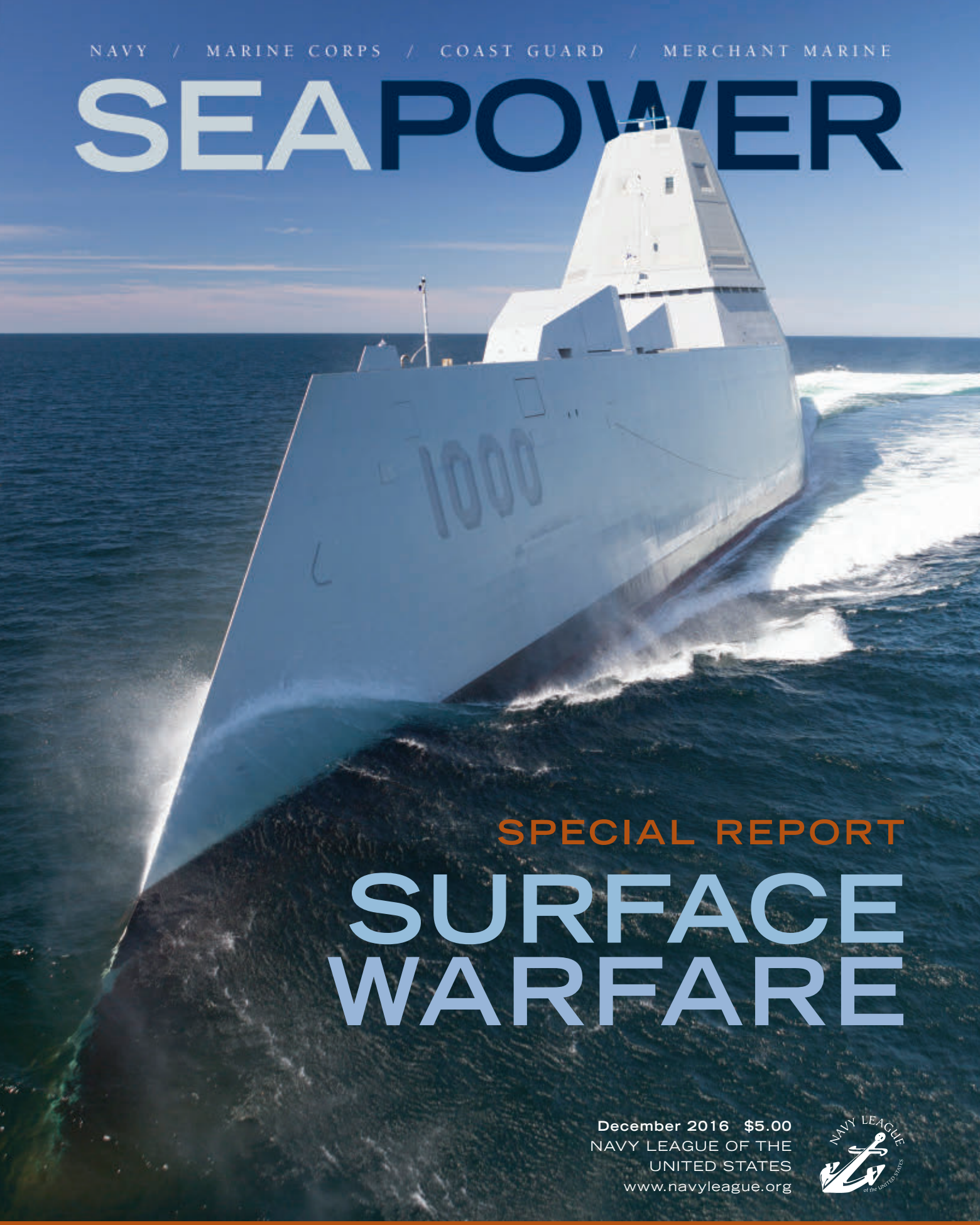

SPECIAL REPORT

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DEPARTMENTS

SPECIAL REPORT: SURFACE WARFARE

FEATURES

COVER PHOTO OF THE GUIDED-MISSILE DESTROYER *ZUMWALT* TRANSITING THE ATLANTIC OCEAN ON APRIL 21 TO CONDUCT ACCEPTANCE TRIALS WITH THE NAVY'S BOARD OF INSPECTION AND SURVEY, THE LAST SIGNIFICANT SHIPBUILDING MILESTONE BEFORE DELIVERY OF THE SHIP, BY THE U.S. NAVY. COVER DESIGN BY LAUREN EMERITZ, ABSTRACT ORANGE DESIGN.

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The Way Forward

By SKIP WITUNSKI, Navy League National President

While change is inevitable in every election cycle, also present is opportunity. The Navy League of the United States takes very seriously our responsibility of educating the American public and their elected leaders on the importance of strong maritime forces to national security and economic prosperity.

One document instrumental in our legislative outreach and engagement is the biennial Maritime Policy, which provides analyses and recommendations on funding, force size, equipment, training and other priorities critical for the sea services and the industrial base that supports them.

The 2017-2018 Maritime Policy, to be published this month, focuses on "Ensuring Strong Sea Services for a Maritime Nation." It is imperative that the new administration and the 115th Congress understand that the U.S. sea services — the Navy, Marine Corps, Coast Guard and U.S.-flag Merchant Marine — must be supported and adequately funded to keep the world's sea lanes open and secure.

"The Navy League believes that if adequate funding is not provided to support the sea services, American naval forces will be trapped in a cycle of decay from which they will be unable to escape," the policy states. "Without adequate, steady and predictable investment, the United States will be less secure and more vulnerable to threats. The wise path is to invest in our sea services now for a more secure future."

The United States is a maritime nation dependent on a strong naval force to preserve freedom of the seas for all, while maintaining maritime superiority. Insufficient funding means longer deployments, deferred maintenance on mission-critical assets, less training and a host of other issues that result in more stress on our forces and a less secure America. We cannot let that happen.

The Maritime Policy recognizes the importance of our international partnerships, which "signal U.S. resolve. The visible exercises that we conduct with our allies remind potential enemies of our capabilities, so that they reconsider any tendency to challenge the United States at sea." Engaging in exercises and operations at sea with our allies and friends extends our reach, promotes stability and peace, and increases the agility and responsiveness of our naval forces.

The policy drives home the fact that budget must not drive strategy. Free and open access to the seas and our economic prosperity and national security are inextricably linked, and underfunding the sea services puts all of that in jeopardy. Year after year, the demands made on our naval forces increase, yet funding remains stagnant, insufficient. The policy notes: "The fact that the capabilities of the sea services are in such high demand speaks to their usefulness."

Our forces must operate forward, appropriately trained and equipped, ready to respond to crises or conflict. They cannot sustain that level of readiness with austerity spending. The term "acceptable risk" is often used in the acquisition world, but when it comes to readiness, no risk is acceptable.

Above all, our elected officials must understand that our most important assets are the people serving in our all-volunteer force and the loved ones who support them. We recruit the best and the brightest, and we must strive to retain them with competitive compensation and benefits. We must keep faith with them, show them what their service means to this nation by setting them up for nothing less than success, for if they are successful, we — as a nation — thrive.

Yes, national elections bring about change as well as some uncertainty, but today we have an opportunity to inform, advocate and educate.

Navy League members across the country and around the world, armed with our Maritime Policy and other educational tools, welcome the opportunity to engage in thoughtful discourse about the way forward for our sea services and for this nation.

A National Imperative

By AMY L. WITTMAN, Editor in Chief

The U.S. Navy in 2007 put forth its Maritime Domain Awareness Concept as a "vision for the exchange and use of maritime information in support of maritime security and safety." It was intended to be an implementation over 10 years that included "the priorities of maritime stakeholders across interagency, commercial industry and private enterprise."

Nearly a decade later, maritime domain awareness (MDA) is defined in the National MDA Plan as "the effective knowledge of anything associated with the maritime domain that could impact the security, safety, economy, or environment of the United States. The maritime domain is all areas and things of, on, under, relating to, adjacent to, or bordering on a sea, ocean, or other navigable waterway, including all maritime-related activities, infrastructure, people, cargo, vessels, and other conveyances."

Because the number of MDA stakeholders is so large and their interests so varied, coordination, collaboration and communication at all levels of government is critical. Overseeing those efforts is the MDA Executive Steering Committee, which includes senior executive-level representatives from the Departments of Defense, Transportation and Homeland Security, along with the National Maritime Intelligence-Integration Office (NMIO) representing the Intelligence Community.

Effective MDA must meet the needs of the stakeholders, all of whom have very different priorities. Managing Editor Richard R. Burgess, in his re port "A Team Sport," discussed these priorities and this whole-of-government approach to MDA with several principals serving on the steering committee and NMIO.

The main challenge to getting an accurate picture, to finding potential threats, at any given time is the ability to sort through an enormous amount of data faster than humans alone can do that.

"The issue is how you manage all that data. Some of the things that we're doing is taking advantage of commercial technologies like the cloud to transport data, trying to get it into one big bucket," said Lynn Wright, deputy director of naval intelligence and director of the Navy's MDA Office.

MDA today is a national strategic imperative and, despite the different priorities of the stakeholders, there is a shared vision. This unprecedented collaboration across several local, state and federal agencies, commercial industry, academia and international partners can only enhance national security and is a model to be emulated.

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MARITIME MATTERS

House Republicans Line Up For Key Defense Panel Jobs

While Republicans have retained their majorities in both chambers of Congress, the House Armed Services Committee is shedding 11 members — including the chairman of the powerful seapower and projection forces subcommittee — heading into the 115th Congress.

The departure of those lawmakers, many of whom have been Armed Services members for a decade or more, will spark a fight for subcommittee leadership posts on the expansive panel, with more junior members already vying for spots that could give them greater say on the committee and influence polices affecting the Navy and Marine Corps.

Republican J. Randy Forbes of Virginia, a strong Navy advocate, lost his primary battle earlier this year, opening up the top job on the seapower and projection forces panel. Fellow Virginia Republican Rob Wittman, now the chairman of the readiness subcommittee, has made no bones about the fact that he wants Forbes' old job.

"I, myself, am going to be looking to move from readiness to seapower and projection forces, which I believe passionately in the things we've been doing," Wittman said Nov. 10 at the *CQ Roll Call* Election Impact Conference in Washington, adding that he expects to find out about the coveted post during the lame-duck session.

LISA NIPP

Rep. Rob Wittman, R-Va., now chairman of the House Armed Services readiness subcommittee, is pushing for leadership of the seapower and projection forces subcommittee in the 115th Congress. Wittman is shown speaking here during the Congressional Breakfast at the Navy League's Sea-Air-Space Exposition in National Harbor, Md., May 17.

He could have some competition for the gavel from other committee members. California Rep. Duncan Hunter, a retired Marine who has served in Congress since taking over his father's seat in 2009, could be considered for the job. But Hunter, an early endorser of President-elect Donald Trump, also is believed to be under consideration for a high-level post in the Trump administration, which would create yet another opening on Armed Services.

Meanwhile, Forbes' name is in the mix for Navy secretary in the Trump administration, a good fit for a lawmaker whose district abuts shipbuilding-heavy Norfolk and Newport News. Forbes has been passionate about boosting the size of the Navy's fleet and otherwise investing more heavily in naval and other defense capabilities — characteristics that would fit with Trump's stated plans to do away with budget caps and raise defense spending by about $500 billion over the next decade, something he will need congressional buy-in for.

Forbes' departure from the House was unexpected. He was running in a new district after the boundaries for the 4th district, which he has represented since 2001, were redrawn to encom-

pass more Democratic voters. But Forbes' strategy to vie for what he considered a safer seat failed as Virginia State Delegate Scott Taylor, a former Navy SEAL who deployed to Iraq, edged him out at the polls amid accusations that Forbes was an outsider.

Taylor, like Hunter and many other veterans serving in Congress, likely will be one of several freshman to secure a seat on the House Armed Services panel in the 115th Congress.

"I think that you'll see, at least with military background and experience, hopefully not a large decline in that level of experience with new members coming in," Wittman said.

Other departing House Armed Services members include personnel subcommittee Chairman Joe Heck of Nevada and Loretta Sanchez of California, the top Democrat on the air and land subcommittee, which oversees aviation programs like the F-35 Lightning II joint strike fighter. Both lawmakers lost their bids for Senate seats. Meanwhile, fellow Armed Services member Rep. Tammy Duckworth, D-Ill., a disabled veteran, won a Senate seat.

The Senate Armed Services Committee remains largely unchanged heading into the next Congress, with most of the panel's leaders returning next year. But the committee — particularly its dealings with the new administration — will be interesting to watch.

Chairman John McCain and Trump have a tumultuous relationship, with the Arizona Republican revoking his endorsement of the incoming president during the final weeks of the campaign. For his part, Trump questioned McCain's status as a war hero, saying at the beginning of the GOP primary campaign that he prefers people who did not get caught, referring to McCain's being held as a prisoner of war for six years in Vietnam.

Trump has no foreign policy or defense experience and McCain, the 2008 GOP presidential nominee, is the de facto leader of the hawkish wing of the Republican party, which was tepid in its support of the business mogul during the bruising presidential contest.

But as he prepares to become commander-in-chief, Trump will need McCain's counsel on matters ranging from weapons programs to international affairs. What's more, however, he will need McCain's backing in a Senate chamber that requires 60 votes to push through anything at all contentious. McCain's support typically brings with it the support of his top lieutenants, including Sen. Lindsey Graham of South Carolina, who also has had an uneasy relationship with Trump.

McCain and Trump surely will disagree on issues as specific as torture to as broad as America's place in the world.

But the two men likely will find strong agreement on at least one matter: defense spending. Trump's plan to boost funding for the military will be welcomed by most Republicans, who believe the Pentagon needs more cash to better prepare for a wide range of threats.

Democrats, led by President Barack Obama, for years have resisted lifting the defense caps without providing similar relief for domestic spending. The limits on the Pentagon's budget have served as a forcing function for patchwork compromises over the years, which have increased both defense and nondefense spending above the caps in the 2011 Budget Control Act.

But with Republicans in control of the White House and both chambers of Congress, it will be easier to boost defense dollars without any equal increase in domestic spending. That could pave the way for billions more for weapons systems like Navy ships and the F-35. But Trump's specific defense spending priorities are yet unknown.

Marine Corps Pushes Rapid Prototyping

The Marine Corps is using the concept of rapid prototyping of technology to reduce the time necessary to field systems and will conduct tests of industry-proposed technology and systems next spring.

The service is planning a series of experiments that will be opportunities for industry to demonstrate new technology or applications, said Lt. Gen. Robert S. Walsh, commanding general, Marine Corps Combat Development Command, and deputy commandant, Combat Development and Integration, and Dr. John Burrow, deputy assistant secretary of the Navy for Research, Development, Test and Evaluation, during an Oct. 19 briefing for reporters on the plans at Marine Corps Base Quantico, Va.

"Our operating concept is no different from what we'd been preaching for many years," Walsh said. "It is about maneuver, it is about finding gaps in seams with the enemy, exploiting those gaps in seams. How do we do it in a 21st-century way and do it differently with new capabilities, new technology? That is where we're attacking it from. And then you get all the pressure to go faster.

"The commandant wants us to go faster. The Hill wants us to go faster. Everybody wants to go faster," he said.

"We're committed to increasing the speed in which we are developing and fielding advanced warfighting capability to our naval forces," Burrow said. "Prototyping and experimentation is an integral part of [that]. Developing the concept, requirements and technology concurrently is a significant change in how we do things.

U.S. MARINE CORPS

Lance Cpl. Zackary W. Rippin, infantry assaultman, 3rd Battalion, 5th Marine Regiment, operates a weaponized Multi-Utility Tactical Transport vehicle during a company assault on Range 400 at Marine Corps Air Ground Combat Center, Twentynine Palms, Calif., Nov. 7 as part of Integrated Training Exercise 1-17. The battalion has been designated as the Marine Corps' experimental force. Prototyping and experimentation are an integral part of the service's push to more rapidly develop and field advanced warfighting capability.

"Increased speed means when the general comes up with a concept or a requirement, my job is to help move that through as fast as we possibly can up to the acquisition phase and deliver capabilities to our Marines or to our Sailors as fast as we possibly can. Prototyping and experimentation are an integral part of every phase that we have and it is the connection between all," he said.

"Industry and academia are doing a lot of good things here, so bringing their ideas to the table, as well as the ideas of our scientists and engineers and the naval research and development establishment, really gives a broad brush both in breadth and depth of ideas that we can come and help solve these problems," Burrow said.

Walsh said the urgent needs process has been working well in many cases in rapidly fielding systems during the recent wars, including the Mine Resistant Ambush Protected Vehicle and counter-improvised explosive device technology.

"There is also the other end of the spectrum of when we determine we've got a program of record that we want to move faster, that is acceleration, too," he said.

Although it technically is not an example of rapid prototyping, the Amphibious Combat Vehicle program as one where mature technology was exploited to rapidly select demonstrators to down-select for further competition, Walsh said.

Burrow said the Navy Department likely would decide in December which technology would be tested next year for possible further development.

Mergers, Acquisitions, Reorganizations

■ **Huntington Ingalls Industries** (HII) has entered into a definitive agreement to acquire **Camber Corp**., a government services company headquartered in Huntsville, Ala. Camber is a provider of sophisticated mission-based and information technology solutions. Its major customers include the U.S. Navy. Upon closing of the acquisition, HII

will reorganize its services businesses to establish a new reportable segment consisting of Camber and the following HII subsidiaries: **AMSEC**, **Continental Maritime of San Diego**, **Newport News Industrial**, **SN3**, **Undersea Solutions Group** and **UniversalPegasus International**. The new segment will be named **HII Technical Solutions**.

■ **Mercury Systems Inc.** has signed a definitive agreement to acquire **CES Creative Electronic Systems S.A.** Based in Geneva, Switzerland, CES is a leading provider of embedded solutions for military and aerospace mission-critical computing applications.

■ **Saab Kockums** will become its own business sector, named **Nautics**, effective Jan. 1. **Gunnar Wieslander** will be head of the business unit while remaining the chief executive officer of **Saab Kockums AB**.

Expansions

■ **HII** will open an office in Canberra, Australia, and has hired **Jeff McCray** as vice president, business development, **HII Australia**. He will be responsible for developing new business opportunities for HII to support the Royal Australian Navy and the U.S. Navy in the South Pacific. Prior to joining HII, McCray was vice president for sales for **Symetrica Inc.**

Collaborations

■ **GE's Marine Solutions** has appointed **Jason Electronics Pte. Ltd.** as its value-added reseller for SeaStream dynamic positioning systems in the Association of Southeast Asian Nations region and China.

Transitions

■ **HII** has appointed **Mary Cullen** vice president of nuclear propulsion at the Newport News Shipbuilding division. She will succeed **Barry Fletcher**, who retired. Cullen most recently led the inactivation of the aircraft carrier USS *Enterprise*. HII also appointed **Susan Jacobs** vice president of human resources and administration at the same division. She will assume her new role on Dec. 2, succeeding **Bill Bell**, who is retiring. Jacobs has served as director of human resources and administration for more than nine years at Ingalls Shipbuilding in Pascagoula, Miss. HII also elected retired Army Maj. Gen. **Augustus Leon Collins** to its Board of Directors. Collins is chief executive officer (CEO) of **MINACT Inc.** and formerly served as commanding general of the Mississippi National Guard.

■ Retired Navy Capt. **Charlie Plumb** is joining the honorary advisory board of **Boulder Crest Retreat for Military Veteran Wellness** in Bluemont, Va. Plumb was a prisoner of war in North Vietnam during the Vietnam War.

■ **Rolls-Royce** has appointed **Andreas Schell** CEO of Rolls-Royce Power Systems. He will take up his new position Jan. 1, succeeding **Dr. Ulrich Dohle**, who is retiring. Schell previously served as vice president, digital strategy, for **UTC Aerospace Systems**.

■ **Paul R. Lundstrom** has joined **Aerojet Rocketdyne Holdings Inc.** as vice president of finance and chief financial officer. Lundstrom most recently served as vice president of investor relations at **United Technologies Corp.**

■ The **Boeing** board of directors has elected **Robert A. Bradway** as a new member. Bradway is chairman and CEO of **Amgen**, one of the world's leading biotechnology companies. He will serve on the Boeing board's Audit and Finance committees.

■ **MBDA** has made several executive committee appointments. **Pasquale Di Bartolomeo** was appointed managing director of **MBDA Italia**, replacing **Antonio Perfetti**, who recently left the company. **Dave Armstrong**, currently Executive Group director-Technical, has been appointed Executive Group director for Sales and Business Development. Armstrong will retain existing responsibilities as managing director of **MBDA UK**. **Gianni Bongianni**, group director-Weapon System Programs, will replace Armstrong as Executive Group director-Technical.

■ **Micael Johansson** becomes new deputy CEO and executive vice president of **SAAB** effective Jan. 1. He will replace **Lennart Sindahl**, who will become senior adviser to the CEO and will leave the Group Management. **Sebastian Carlsson**, press officer, will become new head of Group Communication and a member of the Group Management.

■ **Mark McAndrews**, port director of the **Port of Pascagoula**, Miss., was formally installed Oct. 26 as the 2016-17 chairman of the board for the **American Association of Port Authorities**, succeeding **Jim Quinn**, who is president and CEO of **Port Saint John** in New Brunswick, Canada.

■ **Susan Hayman**, vice president health, safety, quality and the environment, for **Foss Marine**, has been nominated by **President Barack Obama** to the **U.S. Merchant Marine Academy**'s Board of Visitors. Hayman is a 1980 graduate of the academy.

■ **Akoustis Technologies Inc.** has selected **Rohan Houlden** vice president of Engineering. Houlden formerly was general manager of the Connectivity Business Unit at **Qorvo Inc.**

■ **Erik Anderson** has joined **EdgeTech**, a company specializing in high-resolution sonar imaging systems and underwater technology. Andersen previously served with the **National Oceanic and Atmospheric Administration** Office of Coast Survey. ■

Reporting by Seapower *Correspondent Megan Scully of* CQ Roll Call. *Managing Editor Richard R. Burgess contributed to this report.*

Execution, Affordability, Cyber Security

NAVSEA commander articulates priorities for shipbuilding and sustainment

LISA NIPP

Vice Adm. Thomas J. Moore became the 44th commander of Naval Sea Systems Command (NAVSEA) on June 10. He oversees a global workforce of more than 70,000 military and civilian personnel responsible for the development, delivery and maintenance of the Navy's ships, submarines and associated systems.

Moore's familiarity with ships and their systems was honed over 13 years as a surface warfare officer, serving in nuclear-powered cruisers, a guided-missile destroyer and a nuclear-powered aircraft carrier, the last during a refueling and comprehensive overhaul. He became an engineering duty officer in 1994 and since has served in numerous billets involved in maintenance, overhaul, refueling, program management and construction of nuclear-powered aircraft carriers, as well as two tours in the Office of the Chief of Naval Operations.

Most recently, Moore commanded the Program Executive Office for Aircraft Carriers from August 2011 to June 1. Over this five-year period, he led the largest ship acquisition program in the U.S. Navy portfolio; was responsible for designing, building, testing and delivering Ford-class carriers; led the Navy's first-ever inactivation of a nuclear-powered aircraft carrier, USS *Enterprise*; and was the lead in the U.S.-India Joint Working Group Aircraft Carrier Technology Cooperation.

Moore discussed the challenges of building and sustaining the fleet with Managing Editor Richard R. Burgess. Excerpts follow:

How is NAVSEA doing with your No. 1 priority, getting ship and submarine maintenance completed on time and on budget?

MOORE: We're turning the corner. The last four ships in Rota and the FDNF [Forward-Deployed Naval Force] ships came out on time. USS *Iwo Jima* come out of availability in Mayport [Fla.] early.

With the private sector, we've done a much better job. Some of that is because we've recognized that if you want to deliver on time, you've got to define the work package up front and make sure that the work package will fit the capacity you have to get the work done. We're having those discussions earlier on the surface ship side than we had previously.

Moving from MSMO [multi-ship/multi-option] contracts into fixed-price contracts has caused both sides to understand the work up front. There is a lot of more discipline in adding growth. That combination of knowing the work up front, limiting the amount of growth to only the work that is necessary, and the fact that we've matured the class maintenance plans and the tech foundation papers, we're in a much better place on the surface ship side of the house. We're not winning them all yet — that's my mantra — we have to get them all out on time.

In our naval shipyards, we've had some struggles — we haven't gotten ships out on time, particularly the aircraft carriers. *Dwight D. Eisenhower* and *George H.W. Bush* came out late. *Nimitz* took us 20 months to do. We're

working hard [to get] *Theodore Roosevelt* out on time in December. We just brought *Harry S. Truman* in, so we have an opportunity to start with a clean set of paper.

We did not induct [the submarine] USS *Boise* this summer at Norfolk Naval Shipyard. We didn't have the capacity. With our past behavior, we would've put her in the yard for a 22-month availability, but would've kept her there for 47 months, the shipyard's estimate. Sticking it in when you don't have the capacity to do the work is bad. I can't imagine being a ship's force crew member and having to be in the shipyard for 47 months. That's kind of torture for the crew.

We've recognized that we've got to be honest with ourselves, understand the requirement up front and then match that requirement to the capacity available in the shipyard. NAVSEA has got to be held accountable and the naval shipyards have got to be held accountable to get more productive going forward.

I'm seeing pockets of learning that tell me we're starting to do better. Portsmouth Naval Shipyard — and naval shipyards in general — have done very well recently in delivery of submarines on time. We're working across the entire enterprise between the four naval shipyards to share best practices.

But I can give you the most productive workforce that has ever been seen in the history of the world and, if I've got too much work, at the end, I'm still destined to run late. We are making progress in the naval shipyards but there is more work to do.

LISA NIPP

What kinds of factors conspire to work against the ship's completion on time?

MOORE: When availabilities run late, it is typically due to two major things: I don't have enough people to get the work done and/or the plan for the work itself was not a good plan. Fundamentally, we've got to do a better job of tightening up our planning. When you have the plan right and you match the capacity in the shipyard to that plan then, ultimately, we're successful.

SEA 21 [NAVSEA's Deputy Commander for Surface Warfare] has done a detailed study that shows if you identify the growth and get it in the package before you've reached 60 percent completion of the availability, then we finish availabilities on time. When we get growth after the 60 percent completion time, we're almost always late.

I think the same thing would apply to the naval shipyards. I've got 33,850 people in the naval shipyards today. I would like to be at about 35,500. My job is then to explain to the fleet commanders and to the CNO [chief of naval operations] that for this workforce, for these ships, for this work, here is what I can get done and how long it is going to take me.

How is NAVSEA's part of the Optimized Fleet Readiness Plan (OFRP) progressing?

MOORE: OFRP has three purposes: One, is to create a surge-ready force as needed. Two, it is to sustain a rotational force like we typically have. Three, it is designed to get ships and submarines out to their designed service life. We put the maintenance at the beginning of the cycle in recognition that if you don't do the maintenance properly it is hard to have either a surge or a rotational force.

We're in the early stages. When we start delivering the carriers on time, the promises of OFRP will be a lot easier for us to meet. Even though we've run late on some of these availabilities, it is delivering ships and submarines that will reach their expected service life.

Is NAVSEA pushing ahead with remote monitoring of ship systems and condition-based maintenance systems?

MOORE: You can't get to reduced manning if you don't introduce some sort of remote monitoring for ship systems. New ships today — *Zumwalt*, LCS [the littoral combat ship], *Ford* — are designed with systems that allow you to monitor and, in some classes, operate the entire ship from one place. On the maintenance side, we have been doing condition-based maintenance for quite some time. On carriers, for example, about 80 percent of the maintenance we do is condition-based and about 20 percent is traditional time-based maintenance — you know, change the oil on your car every 5,000 miles.

U.S. NAVY

The wrap and scaffolding continues to be removed from the superstructure of the aircraft carrier USS *Theodore Roosevelt* as it completes its scheduled Planned Maintenance Period in San Diego Oct. 17. Vice Adm. Thomas J. Moore, commander of Naval Sea Systems Command, said, "We're working hard [to get] *Theodore Roosevelt* out on time in December."

"We've recognized that we've got to be honest with ourselves, understand the requirement up front and then match that requirement to the capacity available in the shipyard. NAVSEA has got to be held accountable and the naval shipyards have got to be held accountable to get more productive going forward."

These remote monitoring systems and the ability to tap in and mine data will help us in that area in terms of condition-based maintenance. But I would also say, as I look at trying to get ships and submarines out on time, the pendulum may have swung too far. We may be doing too much condition-based maintenance. I say that in the context of if I want to limit growth and not get surprises later in the availability, there's got to be a balance.

We're taking a very close look at maintenance across the board and asking ourselves if this maintenance is condition-based today, would it make sense to go ahead and make some of this maintenance time-directed? Tanks are a classic example. Why wouldn't I plan to build work into the work package on, say, 20 tanks just based on data that I've had previously, rather than wait to open and inspect it? If I get in and open and inspect them, they're fine, then I've got extra budget, but I've already built it into the plan up front, allocated the personnel resources and contracted the work out.

While I'm a strong believer in condition-based maintenance, you shouldn't be doing maintenance that you don't need to do. I'm a strong believer that remote continuous monitoring systems will allow us to do health monitoring of systems, which should cut down on maintenance.

How does a continuing resolution (CR) affect your ability to get the ships out on time?

MOORE: We've been on CRs so long now — nine straight years — it has almost become the new normal. We've almost come to expect the CR now, so we're better at how we manage the money. For instance, when we start scheduling the maintenance availabilities, we try to avoid putting a major maintenance availability that starts in the first quarter of the fiscal year.

It doesn't impact the naval shipyards that much because they are mission funded and, so, they have public employees and we pay their salaries for the year. It does have an impact on the private sector. If you are a business and I say "you only get to go operate in three of the four quarters of your business cycle," any CEO [chief executive officer] would tell me, "Hey, you're nuts."

Promoting a culture of affordability is one of your priorities. Any examples of success?

MOORE: In the naval shipyards, we have learning centers now that allow us to train our workforce in an environment where new workers can fail outside the ship and correct their skills before working on a ship. That way, we don't get the rework that we would have before. Pearl Harbor Naval Shipyard has got a good learning center in welding. In the past, it would've probably taken us five years-plus to train a new apprentice welder to get to the journeyman level to the point where we would've felt comfortable allowing them to go do major welding on a submarine.

Just recently, we had to make pressure-hull cuts on USS *Hawaii*. Two welders who had only been in the shipyard for three years welded the steel plate back on the pressure hull. We have very detailed processes to make sure that the weld is satisfactory. They passed with flying colors. There were no flaws in the weld. That ability to get the work done in fewer hours to avoid the rework is just one example of making every dollar count.

Hybrid electric drive on the surface ships, for instance, is something that is going to result in huge costs savings. We are designing our ships to reduce manpower because people are the most expensive part of the life-cycle cost of the ship.

The littoral combat ship, the Zumwalt-class DDG and the [Gerald R.] Ford-class aircraft carrier were designed from the bottom up to be easier to maintain and operate with fewer people. On a Nimitz-class carrier today, people account for about 40 percent of the total life-cycle costs of the ship. When you factor in the costs to build it, maintain it, refuel it, operate it and then dispose of it, the total is $32 billion in [fiscal] 2008 dollars over 50 years, and 40 percent of that cost is people.

Are you having successes in promoting commonality in auxiliary subsystems?

MOORE: We stood up our commonality division, NAVSEA 06, several years ago to kind of go look at that. The instigator for that was when I was in PEO Carriers.

We recognized that York was building six or seven different air conditioning units — one for carriers, one for subs, one for surface ships, one for LCS — and, in each case, each of the PEOs was giving their own specs. So, if you're York, you'll pick the most stringent spec so that you can ship the unit out to the Navy and the Navy will accept it. That was driving costs into it. What we recognized is, "Hey, we ought to get together on this."

LISA NIPP

One NAVSEA 06 initiative is the Virtual Shelf, where we have put parts that are available, that are common across the ships that we should be choosing from going forward. Everything doesn't have to be brand new from the bottom up. We can buy, for example, a common remote-operated valve for motor-actuated valves. They might be a little more ruggedized for some systems than maybe we would otherwise have chosen, but now have the same value throughout the entire ship — one logistics stream, one tech manual, you've got one OEM [original equipment manufacturer].

How is NAVSEA supporting the drive for distributed lethality in the fleet?

MOORE: When Vice Adm. [Thomas S.] Rowden [commander, Naval Surface Forces] talks about distributed lethality, he is talking about combat systems, networking and power distribution — all things right in our wheelhouse. The LCS is a good example, as we look at the new frigate and try to up-gun that as a way of expanding distributed lethality.

As we move forward, for instance, on the future air defense ship planned for the mid-2030s time frame that is the next-generation ship beyond the Ticonderoga-class cruisers, we are involved in that discussion with the fleet as well. What capability do you want to have on it? What does it have to look like from a naval architecture standpoint? What do you want it to cost? What is the art of the possible?

Vice Adm. Rowden is driving this discussion today. NAVSEA is right in the middle of all that discussion because, ultimately, we're the people who are going to tell them what you can and can't do, not only from a naval architecture standpoint, but from a combat systems standpoint as well. There is a lot of value in us talking to the fleet on a day-to-day basis and making sure, on the technical side of the house, we're delivering the ships and systems that will enable them to execute the operational concepts.

How has NAVSEA's work been affected by headquarters staff reductions?

MOORE: We're working our way through that. When you look back at some of the program offices back in the late 1990s and early 2000s time frame, as we were trying to drive down the size of the workforce, the acquisition workforce got too lean. We have increased our workforce over the years and we're probably at where we're going to be in terms of the overall size of the NAVSEA enterprise.

It doesn't come down to just sheer numbers, though, it also comes down to skills sets. We're heading into an environment where our new ships deliver a large amount of energy — *Zumwalt* with advanced induction motors, *Ford* with its VSR [Volume Search Radar] and EMALS [Electro-Magnetic Aircraft Launch System] and the AMDR [Air and Missile Defense Radar]. We have evolved to an era of advanced induction motors, like where we get rid of reduction gears and we're just driving the shafts with a big motor. We're going away from a lot of steam and reduction gears into an era where these new ships are going to generate a lot of power. You've got to distribute the power and get it to your combat systems as well, which in the future will include directed-energy weapons such as lasers or high-velocity projectiles.

And, so, does NAVSEA possess the talent and knowledge base necessary to go manage what is clearly right around the corner in terms of the new power systems on our ships? What I'm finding is that I'm one deep in some of the expertise that I need in some of these new electrical systems. While the total numbers at NAVSEA may not grow, we've got to stay ahead of the curve in

terms of the new technologies coming down the line and a workforce with the talent to manage that from a technical standpoint. You've got to think about that today. A system may not be coming out for 10 years, but I've got to go recruit talent today, get them into the warfare centers and grow them from the headquarters standpoint.

How are you designing cyber security into the ships?

MOORE: It's one of my three mission priorities, along with the on-time delivery of ships and submarines in this culture of affordability. It's a warfighting imperative for our ships and submarines. I have a cyber council here that meets monthly. We have a very well-defined set of specs that we work to in NAVSEA.

I don't own the ship IT [information technology] systems, but I own all the machinery, control and combat systems that are associated with the ships. We've got to design up front into our systems the ability to be able to protect themselves and to fight through a cyber attack. Having said that, we have to be careful.

One of the huge warfighting advantages that our Navy has over the rest of the world is our ability to network weapon systems and sensors and to move data rapidly from a warfighting perspective. There is the thought that the easiest way is just disconnect — unplug from the gig, unplug from the network, get off the satellite — and then you won't get attacked. There may be instances where we need to do that, but what I'm emphasizing here is to take a systems engineering approach to how we build these systems and factor cyber in on the front end to do the best you can to minimize the disruption to the systems.

When disruption does happen, warfighters need the ability to work around that. Building redundancy into systems and not relying on one particular system to do everything will help. But it's going to happen. As I tell my people all the time, it's no different than any other warfighting advance throughout the history of mankind. I don't view cyber as any different than that. While it is something to take very, very seriously, I don't think it's something to fear.

We have proven over the years the ingenuity of the American worker and the technical people who work here. Our ability to stay one step ahead of our competitors is something that has always made us the best Navy in the world. We just need to continue to do that going forward on the cyber front.

What are the most important things defense industry can do to help NAVSEA in executing its goals?

MOORE: The best thing we can do with industry is to consider them a critical partner. We need to listen to industry and industry needs to listen to us. We must work collaboratively on this. We have the best industry in the world and they will build what we want them to build. We need to involve them early in the discussions about what is it we want, the art of the possible and what it's going to cost, and then get them in the front door on the design.

A lot of the great ideas we've had today came directly from industry. We've got to encourage them to invest in their plants and facilities to make themselves more affordable. We've got to encourage them to help us out to get leading-edge technology on the ship.

My experience with them over the past 20 years building aircraft carriers is that they are great partners with us and, when we can articulate the requirements with them, they go out and put a great product on the street. They are patriots and they're a business that needs to make a reasonable profit but, at the end of the day, we wouldn't have the Navy we have today if it weren't for the great industry partners that we have. ■

LISA NIPP

Zumwalt Joins the Fleet

The Navy's new guided-missile destroyer heads for homeport and further testing

By RICHARD R. BURGESS, Managing Editor

'Souped-Up SUV'

The 15,900-ton destroyer USS *Zumwalt* was commissioned into the fleet on Oct. 15 in Baltimore.

- The first-in-class ship heads for its homeport in San Diego for further systems activation and trials.
- *Zumwalt*'s radar cross section is 1/50th that of an Arleigh Burke-class DDG.
- Initial operational capability is set for 2019.

The Navy's newest warship looks like none that have gone before, a massive 15,900-ton guided-missile destroyer (DDG) that is larger than some World War II cruisers. Although its exterior reflects striking design differences with older warships, many of its power, mission and control systems also are departures from the ways of the past.

The Navy showed off its newest class of ship, the Zumwalt-class guided-missile destroyer (DDG 1000) to reporters Oct. 13, two days before its commissioning ceremony in Baltimore. *Zumwalt*, named for the late former Chief of Naval Operations Adm. Elmo "Bud" Zumwalt, visited for the city's Fleet Week celebration and berthed alongside an Arleigh Burke-class DDG and a Ticonderoga-class guided-missile cruiser, which provided contrasts to the sleek, smooth lines of *Zumwalt*'s tumblehome hull and low-radar cross section.

Zumwalt now is the largest and most heavily armed surface warship in the Navy. It is armed with the largest and longest-range gun in the fleet, has the largest number of missile launchers, the most powerful electrical power supply system, a sophisticated air defense radar, an integrated mission system, new sonars and extraordinary situational awareness for the crew. The ship will bring increased lethality, including offensive power, and survivability to the fleet.

Zumwalt, built by General Dynamics' Bath Iron Works in Bath, Maine, is armed with two 155mm Advanced Gun Systems (AGSs) built by BAE Systems specifically for the Zumwalt class. The two AGSs are mounted in tandem on the forward weather deck and housed in enclosures that add to the stealth characteristics of the ship's radar cross section.

The guns are designed to fire the 225-pound, rocket-assisted, Global Positioning System-guided Long-Range Land-Attack Projectiles, designed by Lockheed Martin for striking targets up to 83 nautical miles away — triple the range of the Mk45 5-inch guns onboard older cruisers and destroyers — with unitary warheads.

The new destroyer also is equipped with 80 launch cells of the Mk57 Peripheral Vertical Launch System (PVLS). Unlike the Mk41 VLS on older ships, with cells arranged in a box array amidships, the PVLS cells line the edge of the ship, 40 on each side. The PVLS can launch SM-2/3/6 Standard surface-to-air missiles, RIM-162 Evolved Sea Sparrow surface-to-air missiles, BGM-109 Tomahawk cruise missiles, as well as Vertical-Launch Anti-Submarine Rockets that deliver Mk54 anti-submarine torpedoes to submarine targets up to 10 miles away.

Zumwalt eventually will be fitted with two 30mm Mk46 Close-In Gun Systems, installed above the helicopter hangar. The ship also carries .50-caliber M2 machine guns, which can be installed for transits to and from port and if needed to counter small boats. Unlike other destroyers and cruisers, *Zumwalt* does not carry the Mk38 25mm chain gun or the Mk15 Phalanx Close-In Weapon System.

Lacking the Phalanx, *Zumwalt* will rely instead on the Evolved Sea Sparrow missile for close-in defense against cruise missiles, Christianne M. Witten, a

U.S. NAVY

An MH-60R Seahawk assigned to Air Test and Evaluation Squadron 21 flies near the guided-missile destroyer USS *Zumwalt* as the ship travels in the Chesapeake Bay Oct. 17 on its way to its new homeport of San Diego. Partially coated with radar-absorbent tiles, *Zumwalt*'s smooth hull is almost completely free of protrusions common on a more conventional warship, giving it a small radar cross section.

spokeswoman for Naval Sea Systems Command, said in e-mail responses to *Seapower*.

The ship can accommodate two MH-60R Seahawk helicopters for anti-submarine warfare and maritime strike, as well as MQ-8 Fire Scout unmanned aerial vehicles for over-the-horizon surveillance.

Capt. James Kirk, the ship's commanding officer, said *Zumwalt* rides "marvelously" through the waves, describing its ride as feeling "like a souped-up sport utility vehicle [SUV]."

Lt. Cmdr. Nate Chase, the ship's chief engineer with experience in Arleigh Burke-class DDGs, agreed, saying the ship rides "exponentially better" than an Arleigh Burke. He recalled that during one sortie from the shipyard some shipyard workers onboard asked when the ship was getting underway when it had left port 45 minutes earlier.

"This ship blows the Burke out of the water," Chase said of the new ship.

Chase highlighted the stealth characteristics of *Zumwalt*, with its small radar cross section (RCS), which he said was 1/50th that of an Arleigh Burke. *Zumwalt*'s hull is partially coated with radar-absorbent tiles. The exceptionally smooth hull is almost completely free of protrusions common on a more conventional warship. The guardlines that line the weather deck of a conventional destroyer are absent from *Zumwalt*.

For safety while arriving and departing port, and while in port, the crew rigs removable lifelines on the forward portion of the ship. On the aft flight deck, the deck edges are lined on three sides with small doors that resemble small blast deflectors that are raised from a horizontal position flush with the deck to a vertical barrier that forms as a safety feature.

That such a large warship could make such a small radar target seems implausible, but Chase gave an example of *Zumwalt*'s stealth, noting that during the ship's rescue of a fisherman in December, a Coast Guard cutter had difficulty rendezvousing with the destroyer because of its low RCS. The ship can mount removable radar reflectors so that other ships can be aware of its presence when necessary.

Chase also noted the ship's electrical power generation capability, 78 megawatts versus nine for an Arleigh Burke, enough to power a small city. The ship's integrated power system allows the crew to shift power to systems as needed based on mission priorities, a capability that will prove necessary on it or future ships to power directed energy weapons such as lasers or electromagnetic rail guns.

Zumwalt's 147-Sailor crew is half the size of that of an Arleigh Burke, and even smaller than the crew of the now-decommissioned Perry-class frigates, and as such needs the help of advanced technology to carry the load.

The ship is equipped with the Total Ship Computing Environment, designed by Raytheon Integrated Defense Systems, which integrates all of the mission and engineering systems.

The bridge is manned only by three watchstanders: an officer of the deck, a junior officer of the deck and a junior officer of the watch. The latter two sit at computer consoles from which they control the navigation of the ship, and are surrounded by large-screen displays that give them situational awareness from a set of electro-optical cameras.

The bridge console features a traditional set of throttles that are reserved for "tertiary" use if needed. The bridge has no traditional wheel for a helmsman, with simple cookie-sized control dials as back-up controls for the electrical steering system.

The combat information center is called a Ship's Mission Center on *Zumwalt*. One unusual feature is the stationing of the engineering officer of the watch in the center. Chase said this blending of engineering and operations personnel in the same space "sparks a cross-talk between the rates."

Chase said the small size of the crew makes it a "pretty close family."

The ship also features a boat bay that can launch two 11-meter or three 7-meter rigid-hull inflatable boats out of a stern ramp. The boats can be loaded in the bay and the boat cradles can be lifted and tilted to slide the boats out of the stern. The two 11-meter boats currently onboard are named "Russell" and "Elmo" in honor of Zumwalt's son and grandson, respectively, an outward sign of the crew's appreciation of the legacy of the ship's namesake.

Zumwalt is designed for crew comfort and relative privacy. All personnel live in two- or four-person staterooms with heads, or bathrooms, rather than the large berthing compartments as on older ships, Chase said. The ship's galley prepares meals for all ranks, a departure from the different messes for officers, chiefs and enlisted personnel.

After commissioning, *Zumwalt* departed for the U.S. West Coast on Oct. 20 for a scheduled arrival in December. From its homeport of San Diego, it will have the rest of its mission systems installed and tested before the ship works up for its first deployment, Kirk said.

The ship currently is fitted with a Furuno commercial navigation radar suite to enable it to safely operate before it receives some of its mission systems. The crew is busy writing the manuals that will govern the ship's operation as it becomes familiar with the ship's technology. Initial operational capability is planned for 2019, Witten said.

"All ship systems, with the exception of certain combat systems, aviation capabilities and communication [systems] are active," Witten said. "Major systems to be installed during Post-Delivery Availability include program-of-record communication equipment and the Mk46 Close-In Gun System."

Witten said that as of November, the second and third ships of the class, *Michael Monsoor* (DDG 1001) and *Lyndon B. Johnson* (DDG 1002), currently are 91 percent and 59 percent complete, respectively. ■

U.S. NAVY

Petty Officer 2nd Class Alfredo Echevarria stands watch on the bridge of USS *Zumwalt* Oct. 22 in the Atlantic Ocean. The Ship's Mission Center on *Zumwalt* stations the engineering officer of the watch in the center of the bridge, and the blending of engineering and operations personnel in the same space "sparks a cross-talk between the rates," according to the ship's chief engineer.

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Hitting Its Stride

The littoral combat ship is benefiting from stability and operating experience

By RICHARD R. BURGESS, Managing Editor

'Good Momentum'

Despite some glitches, including a series of engineering casualties in several ships over the last year, the littoral combat ship (LCS) "will be the second largest surface ship class in the Navy" by 2018, according to the program executive officer.

- Serial production and deployment lessons benefit the LCS program.
- Blue/Gold crewing and the training ship concept will increase deployments.
- New frigate proposals will be requested in late 2017.

The Navy's littoral combat ship (LCS) program is showing the benefit of lessons learned, steady serial production, initial deployment and added lethality. The ships are entering the fleet at a rate for four per year now. The Navy also is adjusting its LCS homeport plan, multi-crew concept and training plan as the service also prepares to shift production to a new frigate based on one of the two LCS sea frames.

"We have some good momentum," Rear Adm. John P. Neagley, program executive officer for LCSs, said in e-mail responses to *Seapower*, noting that there now are eight LCSs in commission and 18 more under contract. "Our industry teams have ramped up to deliver two ships per year at each yard, and by 2018 LCS will be the second largest surface ship class in the Navy."

The Freedom variant of LCS is built by a Lockheed Martin industry team at Marinette, Wis. The Independence-class LCS currently is built in Mobile, Ala., by Austal USA. The two variants reached initial operational capability in 2014 and 2015, respectively.

Two Freedom-variant LCSs — *Freedom* and *Fort Worth* — have deployed with a surface warfare mission package to the Western Pacific and returned. Of the other variant, *Coronado* now is deployed, armed with Harpoon cruise missiles as a retrofit to add more lethality. Shock trials have been completed on both classes.

"The LCS program is on budget and underneath the Congressional cost cap, and both yards are coming down the learning curve," Neagley said. "The block buy contracts for LCS 5 and follow and LCS 6 and follow have resulted in a steady decline in the LCS shipbuilding program's production unit costs. We're procuring the ships via a block buy strategy, and we'll continue to see the benefits of economic order quantities that result from that."

With the intense scrutiny on the LCS program, glitches are a magnet for congressional and media attention. A series of engineering problems, or casualties, in several ships over the last year attracted such attention.

"We are looking at each of those casualties and there are no apparent connections between them — some have been determined to be operator error, others were design issues, and root cause analysis for others is ongoing," Neagley said. "The Navy has compared LCS engineering reliability with our experience on other recently introduced platforms and, overall, the frequency and severity of propulsion issues identified on LCS are consistent with other classes of ships at the same point in their fleet introduction.

"The other important context to keep in mind is the rapid pace at which LCS is being delivered to the fleet — we are ramping up to four ships total per year, and this puts more of our ships inside the standard post-delivery test and trial window at one time," he said. "That's a standard period of time for all new Navy ships, during which we expect to see issues arise in new ships and we have the post-delivery availabilities

U.S. NAVY

The Independence-variant littoral combat ship USS *Coronado* launches its first over-the-horizon missile engagement using a Harpoon Block 1C missile during the Rim of the Pacific exercise off Hawaii July 19.

scheduled to fix things as they come up. This is not unique to LCS at all — we just have more ships inside that window than any other Navy shipbuilding program in recent history at any given time."

Neagley said he has seen progress with each LCS deployment.

"As the Navy continues to gain operational experience with these ships, we will continue to refine our sustainment approach and more fully realize their incredible potential," he said. "Lessons learned from USS *Freedom*'s maiden Western Pacific deployment were instrumental in improving performance on USS *Fort Worth*, and when you compare *Freedom*'s 298-day deployment to the first 298 days of *Fort Worth*'s deployment, *Fort Worth* operated underway an additional 46 days. During *Fort Worth*'s deployment, we also successfully executed an expeditionary maintenance period in Sasebo [Japan], which further extended her operational range."

The three mission packages (MPs) that define the LCS concept — surface warfare (SUW), anti-submarine warfare (ASW) and mine countermeasures (MCM) — are at various stages of development or deployment. Their component mission modules have changed to varying degrees over the years of development as systems were changed out according to their performance and reliability.

The initial configurations of the SUW MP were operational with the first three deployments, including currently with *Coronado*.

"The next capability to be added to the SUW MP is the Surface-to-Surface Missile Module (SSMM), which we are currently testing for fielding in 2018," Neagley said. "The SSMM completed a key restrained firing test in August 2016 and we are on track to conduct structural test firing of the SSMM's Longbow Hellfire missile from an LCS in 2017."

The ASW and MCM MPs still are in testing.

"The ASW MP had an extremely successful at-sea demo in 2014," Neagley said. "We've just awarded a contract to Raytheon for a variable-depth sonar and multifunction towed array, and are procuring a preproduction test article that will be used to IOC [bring to initial operational capability] the ASW MP on the Freedom variant. That testing is slated to begin in [fiscal] '18.

"The MCM MP completed Technical Evaluation in 2015," he said. "The MCM MP exceeded the requirement for mine clearance but the reliability of one system in the package, the Remote Mine-hunting System, was unsatisfactory to us. As a result, the Navy stood up an Independent Review Team to look at other alternatives for mine-hunting in the volume, and we're currently implementing their recommendations. IOC for the MCM MP is now scheduled for [fiscal] '20 assuming the funding remains stable."

During the July Rim of the Pacific exercise, the Mk18 mine-hunting autonomous underwater vehicle was successfully deployed on an LCS, performing 70 missions.

With the experience accumulated over three deployments, the Navy has made several changes to the way it will test, man, train in and operate the LCS to increase its availability, which was promulgated in a Sept. 8 release from Vice Adm. Thomas S. Rowden, commander, Naval Surface Forces.

The Navy is changing the original 3:2:1 crew concept — three crews, two ships, one deployed — to a Blue/Gold concept similar to that used by the ballistic-missile submarine force, minesweepers and coastal patrol ships, with two crews dedicated to each LCS. The MP detachments will merge with the LCS crews. The ships will be

organized in four-ship divisions specializing in a single warfare specialty, with three deployable ships and the fourth a dedicated training ship that will remain in local waters to train and certify the crews.

"The first four LCSs will become testing ships," Rowden said in the release. "Like the training ships, testing ships will be single-crewed and could be deployed as fleet assets if needed on a limited basis; however, their primary purpose will be to satisfy near- and long-term testing requirements for the entire LCS class without affecting ongoing deployment rotations. This approach accommodates spiral development and rapid deployment of emerging weapons and delivery systems to the fleet without disrupting operational schedules."

"The first four ships were originally meant to be RDT&E [research, development, test & evaluation] ships, making them well-suited for testing ships," Lt. Cmdr. Rebecca Haggard, media operations officer for Rowden, said in an e-mail response to *Seapower*. "Additionally, having four instead of two testing ships allows for a greater range of testing in a more expedient manner and takes things like required maintenance into account."

"Implementing these changes now, and as more LCS ships are commissioned over the coming years, ultimately will allow the Navy to deploy more ships, increasing overall forward presence," Rowden said. "With the Blue/Gold model in place, three out of four ships will be available for deployment compared with one out of two under 3:2:1. The Blue/Gold model also will simplify ownership of maintenance responsibilities and enhance continuity as the same two crews rotate on a single ship."

The Navy also decided to base the LCSs according to variant, with the Independence variant based in San Diego and the Freedom variant in Mayport, Fla. The decision to base the Freedom variant on the East Coast was a matter of practicality.

"It comes down to pier support," Haggard said. "The Freedom variant, due to its size, is a better fit for the port loading requirements of Mayport."

Neagley's office also is preparing for the development and production of the new frigate based on the LCS sea frame, with eight ships currently planned for the program. The request for proposals for the frigate program is expected to be released in late fiscal 2017.

"Our current plan is to down-select to a single frigate design in [fiscal] '18 and build frigates through the remainder of the Future Years Defense Plan," Neagley said.

"While LCS plays a vital role in American maritime security, with the modified LCS, the Navy adds increased organic capability at a reasonable cost," he said. "The modified LCS is designated as Frigate, a designation more suited to their planned missions. Consistent with the fleet's views on the most valued capabilities delivered by a small surface combatant, the frigate will provide multimission anti-surface warfare and anti-submarine warfare capabilities, as well as continuous and effective air, surface and underwater self-defense capabilities."

The Navy's initiatives to increase the lethality of its warships also is in the works for the LCS and the new frigate.

"The Navy intends to release a Request for Proposal the first half of fiscal year 2017 for the Over-The-Horizon Weapon System [OTH-WS] requirement," Neagley said. "The procurement will support an OTH-WS capability for all frigates and littoral combat ships."

Haggard said the LCS program "will inform the way the frigate program is organized, but it is too early to say exactly how they will be employed." ■

U.S. NAVY

The Freedom-variant littoral combat ship USS *Milwaukee* transits out of Naval Station Mayport, Fla., after a maintenance period June 8. The ship suffered an engine casualty during an Atlantic Ocean transit in December, a month after it was commissioned. *Milwaukee* entered its maintenance period in mid-February to prepare for shock trials, which began in September.

Defending the Ship

Recent attack shows sophistication of Navy ship self-defense systems

By DANIEL P. TAYLOR, Special Correspondent

Deep Arsenal

Recent events off the coast of Yemen demonstrate just how critical ship self-defense systems are, as a missile attack can come from just about anywhere at any time.

- The battery of countermeasures can include missiles, decoys and close-in weapons systems.
- Thirty-seven ships now use the Ship Self-Defense System, a combat management system that is in service on aircraft carriers and amphibious ships.
- One future advancement is the Block 2 upgrade of the Surface Electronic Warfare Improvement Program, which replaces existing hardware to bolster detection and jamming capabilities on ships.

An unprovoked missile attack from rebel-controlled areas in Yemen in early October saw Sailors aboard the Arleigh Burke-class guided-missile destroyer USS *Mason* spring into action. The missiles slammed into the water before reaching the ship, but the incident sparked headlines around the world because of the rarity of an attack on a U.S. Navy ship.

The event also illustrated just how tough it is to hit Navy ships, which are more prepared than ever before for a missile attack with increasingly sophisticated defense systems.

The attack happened near the Bab-el-Mandeb Strait, a major gateway for oil tankers that use the Suez Canal en route to Europe. Yemeni fighters have attacked ships near the strait before.

Cmdr. Bill Urban, a U.S. Fifth Fleet spokesman stationed in Bahrain, said that USS *Mason* was involved in an incident in the southern Red Sea after spotting what appeared to be a missile threat.

"Their captains responded appropriately to the indications they received," Urban said. "They deployed countermeasures, and none of the ships in the company were injured or damaged." Urban said the countermeasure systems on the ship are designed to either engage the missile directly or distract the missile away from the ship, depending on which system is used.

"None of the attacks were successful," Urban said. "They had good indications at the time and they deployed countermeasures."

Even a month later, it still was not entirely clear what happened during the engagement.

"We're doing a further review of the engagements with experts in the continental United States, and they are reviewing the data from the engagement," Urban said.

A Navy official on background confirmed reports that Standard Missile-2s (SM-2s) were fired from the ship along with other countermeasures. The Raytheon-made SM-2 is a fleet-area air defense weapon with a range of 90 nautical miles and a ceiling altitude of 65,000 feet. It uses active radar target detection to track its target.

The incident shows just how critical such countermeasures are, as a missile can come from just about anywhere at any time, and the ship's crew has to be able to act quickly.

Bryan Clark, a senior fellow with the Washington-based Center for Strategic and Budgetary Assessments, said that the Yemen incident likely involved C-802 missiles built on "some ancient technology." He said the Navy approach likely was to assess the threat, fire SM-2s at it and then wait and, depending on the range and if the missiles keep coming, use Evolved Sea Sparrow Missiles (ESSMs) at about 10-15 miles out.

Because the C-802 is a sea-skimming missile, it could be detected once it broke the horizon, which would not give the crew a whole lot of time.

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What happened once the ship detected the missiles demonstrates just how deep an arsenal the Navy has for dealing with threats.

"So it appears what they might have done is try to launch all three weapons, and then simultaneously use the warfare system to try to jam or deceive to get the missile to break lock, and try to drag it off to the side," Clark said. "Then they would launch a Nulka decoy. It's off on the side and it attracts the missile to it, and it moves away from the ship and just misses it. So they couldn't tell what happened, but they could tell a missile didn't hit it, so either the C-802s failed, or the electronic warfare was successful and caused the missiles to break lock and go off course and crash."

Had it been a totally different class of vessel in this situation, the result likely would have been the same, Clark said.

"They're very much the same, whether it be a destroyer or a cruiser," he said. "They have mostly the same electronic warfare and missile defense suites, depending on how modern their baseline is, especially when it comes to this kind of threat."

Of course, some of the newer ships may benefit from the latest bells and whistles. The littoral combat ship (LCS) would rely on its radar warning receiver, which would pick up radar from a missile coming at the ship, similar to a radar detector in your car. Then, the crew would launch a Rolling Airframe Missile (RAM), which tracks the infrared signature of an incoming cruise missile. The Navy plans to add the SeaRAM to the LCS, which is a RAM missile launcher with a Phalanx Close-In Weapon System.

"It works really well because it's completely self-contained," Clark said. "If you get alerted, it narrows it down to a solution and fires a missile."

Amphibs and carriers have RAMs and ESSMs, which have a longer range than RAMs.

There are other examples of systems put in place in recent years to defend Navy ships as the concern about the threat continues to rise among Navy leadership. Raytheon's Ship Self-Defense System (SSDS) is one of those examples. The SSDS is a combat management system that currently is in service on aircraft carriers and amphibious ships. In total, 37 ships use the system stretching across seven ship classes, and two-thirds of Navy Sailors are protected by the SSDS MK 2 system on any given day, Raytheon spokeswoman Carolyn Beaudry said in an e-mail response to *Seapower* questions.

"SSDS MK 2 was the first fleet use of open architecture computing environment hardware and software that uses commercial, off-the-shelf software, and uses selected common software components with the Total Ship Computing Environment on the DDG 1000-class destroyer," Beaudry said. "SSDS Single Source Library provides warfighting improvements that are affordable and technically faster to field across all SSDS platforms. SSDS has incorporated the Navy's Product Line Architecture, which provides a common backbone across multiple combat management systems and allows rapid integration of new capabilities across the fleet, reducing overall cost to the Navy."

U.S. NAVY

Sailors monitor ship self-defense systems during general quarters in the combat information center of the amphibious transport dock ship USS *San Antonio* Oct. 12 in the Bab-el-Mandeb Strait between Yemen on the Arabian Peninsula, and Djibouti and Eritrea in the Horn of Africa.

Beaudry said SSDS will continue to evolve to "counter current and emerging threats," something it could do because of its open architecture design.

Despite the sophisticated response to threats that the Navy has today, the technology has not advanced a whole lot in the last 10 years, Clark said.

"Since it takes a while to get a new platform out there, what we see showing up today is the stuff pushed into the pipeline 10 years ago," he said. "That's when the threat was starting to manifest itself. These threats could be launched from shore by a terrorist group, so the Navy started turning the crank and now we're starting to see systems come out that deal with the threat. RAM started showing up 10 years ago, so RAM is now fully fielded in the fleet. That's the big change."

One big future advancement ships will get to enjoy is the Block 2 upgrade of the Surface Electronic Warfare Improvement Program, which replaces existing SLQ-32 hardware to improve detection and jamming capabilities on ships. The first Block 2 upgrades were installed on Arleigh Burke-class destroyers in 2014, and it was tested on the LCS USS *Freedom* later that year.

"That allows us to switch from an analog system warning receiver and jammer to a digital system," Clark said. "That's a big difference. You've got a much wider range, digitally reprogrammable waveforms — that's again something that's starting development in the fleet."

Fleet Forces Command was unable to respond to a request for comment by press time Nov. 15. ■

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Effective maritime domain awareness requires a whole-of-government approach

By RICHARD R. BURGESS, Managing Editor

Hiding in the Maritime Commons

Maritime domain awareness (MDA) now is a national-level concern requiring seamless cooperation between the stakeholders and domestic and international partners.

- A national MDA plan is fostering multi-agency cooperation and standardization of information sharing.
- New algorithms are needed to sort through vast amounts of data to isolate vessels of interest.
- "Dark targets" are the top concern for homeland security.

Maritime domain awareness (MDA) is simple in concept, but it has come to mean much more than the vessels traversing the oceans and waterways around the world. As the concept has matured, especially since 9/11, MDA has come to mean a comprehensive situational awareness that goes beyond naval operations to include commercial shipping and fishing vessels, and concerns about terrorism, human trafficking, weapons of mass destruction, and the safety of ports and harbors.

MDA has been elevated from a purely operational concern of a commander to a national strategic imperative, one that encompasses the missions of a wide array of federal agencies. The National MDA Plan, which defines the concept, requirements and strategy, now is the governing document for the various agencies responsible for contributing to MDA.

"MDA is the effective knowledge of anything associated with the maritime domain that could impact the security, safety, economy, or environment of the United States," the National MDA Plan says. "The maritime domain is all areas and things of, on, under, relating to, adjacent to, or bordering on a sea, ocean, or other navigable waterway, including all maritime-related activities, infrastructure, people, cargo, vessels, and other conveyances."

"To me, MDA runs the gamut from observations of the seaman on watch to data from national assets; situational awareness to analyzed intelligence," said Hank Blaney, MDA policy analyst in Coast Guard Intelligence, who also serves as the Department of Homeland Security (DHS) deputy for the Maritime Domain Awareness Executive Steering Committee (MDA ESC).

"The biggest change that I've observed has been the collaboration between federal agencies responsible for MDA and our other state, local, territorial, tribal, private and industry partners," Blaney said. "The finest example of this collaboration is the National Intelligence-Integration Office [NMIO]."

Multi-Agency Cooperation

The NMIO is an office in the U.S. Intelligence Community that coordinates policy at a national level for all of the agencies involved with MDA. Navy Rear Adm. Robert D. Sharp is director of the NMIO and chair of the MDA ESC.

"NMIO was created to advance governmental collaboration and unity of effort as outlined in the '9/11 Commission Report,' the Intelligence Reform and Terrorism Prevention Act of 2004 and the National Strategy for Maritime Security," NMIO said in an Aug. 12 release. "NMIO facilitates information sharing and collaboration across the Global Maritime Community of Interest, which consists of U.S. federal, state, local, tribal, and territorial governments; maritime industry; academia; and foreign partners."

By December, NMIO was to be designated the national intelligence manager for the maritime domain, said Scott Beaton, maritime security department head at NMIO.

COURTESY OF THE PORT OF LONG BEACH

A security officer stands the watch at the Port of Long Beach, Calif., the second-busiest container port in the United States after the Port of Los Angeles, which it adjoins. The Maritime Domain Awareness Executive Steering Committee has embarked on a number of information-sharing initiatives to bring a "whole-of-government" approach for addressing maritime threats to protect the nation's ports, vessels and mariners.

"Our focus is not naval stuff; it's maritime stuff," he said. "What trends can emerge out of the maritime domain or the maritime transportation system? Those could be asymmetrical terrorist threats using ships as weapons or shipping nasty cargo like WMD [weapons of mass destruction] or weapons or illicit drugs, human smuggling and so forth. We do a lot of unclassified outreach and engagement across the federal interagency, across state and local law enforcement, with academia, with private industry — mainly the maritime sector — and international partners to promote information sharing of maritime data to enhance global maritime security."

The three major departments with stakes in MDA have appointed executive agents for the effort. The secretary of the Navy is the Defense Department's (DoD's) executive agent for MDA; likewise the commandant of the Coast Guard for DHS, and the maritime administrator in the Maritime Administration, or MARAD, for the Department of Transportation (DOT). Each of these agents have appointed principals down the chain of command for the MDA ESC.

"Our job, as we come together, is to make sure that we appropriately share that information with each other and we bring down all the policy, legal, statutory barriers to information sharing to improve on mutual MDA," Beaton said of the MDA ESC.

Each of the principal stakeholders has different priorities in MDA.

"DHS and the Coast Guard concentrate, primarily but not entirely, on maintaining secure national borders and offshore approaches," Blaney said. "This includes the Exclusive Economic Zone of the continental U.S., Alaska and Hawaii, and our territories throughout the world. Since our policy is to act on issues as early and as far from the United States as possible, we concern ourselves with events and people that may be thousands of miles from the U.S. One area where the Coast Guard differs from some of our partner agencies is that we consider MDA essential for the effective prosecution of all of the Coast Guard's missions, not just maritime security."

"From my perspective, I actively seek ways and means to ensure a resilient and integrated U.S. maritime transportation system," said Kimberly D. Brown, maritime domain officer for MARAD and its MDA ESC deputy. "We work collaboratively with industry, government agencies, academia and international partners to develop and encourage best practices and innovative methods to protect our nation's ports, vessels and mariners. We strive to serve as a catalyst among diverse maritime interests to promote the sharing of appropriate information to enhance commerce, maritime security and reliability of the maritime transportation system.

"Since 2014, MARAD and the MDA ESC have embarked on a number of information-sharing initiatives that bring a more 'whole-of-government' approach to the table when addressing maritime threats, especially when addressing issues of symmetric or asymmetric threats," Brown said. "A more streamlined and efficient U.S. Maritime Alerts and Advisory Process has been formulated to more rapidly inform U.S. maritime interests of global threats in the maritime domain. The Maritime Administration ensures that MARAD, DOT and private-sector stakeholders are appropriately informed of relevant MDA resources and new developments. Upon request by other DOT or interagency partners, we engage with maritime industry partners to ascertain their views and MDA needs."

Brown said MARAD meets with the security officers of ports and shipping companies to discuss their needs. Cyber security was the focus of one recent meeting.

"We basically provided extensive outreach and logistical support to our industry, discussing the various mechanisms on how we can provide maritime safety and security information to our maritime industry and licensed mariners," she said.

MARAD sends bulletins to U.S.-flag shipping, as well as internationally through its public website.

The Office of Naval Intelligence (ONI) maintains a global maritime watch center in Suitland, Md., managed by Sharp. In the same facility is the Coast Guard Intelligence Coordination Center and they share a part of the watch at ONI.

"You have immediate lash up of the two largest organizations when you talk about maritime domain concerns," said Lynn Wright, deputy director of naval intelligence and director of the DoD's MDA Office. "They are wired into the other watch centers. It is really a tremendous synergy."

A year ago, the Navy entered an intelligence-sharing agreement with the Coast Guard, said Joseph Enright, a former Navy submarine rear admiral and now director for Integration and Hard Target Strategies for Naval Intelligence and MDA ESC principal for the Defense Department. A whole-of-government approach is "a much tougher challenge," he said, noting that a goal is to disseminate data for "whatever the local interest is" to more than 80 state, local and other agencies "to use as they see fit so they are aware of what's going on in their local areas."

Big Data

Wright traces the origins of the current scope of MDA to the mid- to late-1990s and a Coast Guard officer, then-Cmdr. Steve Flynn, and, within the Navy, to the operators who envisioned long-range weapons "beyond the organic targeting capabilities of our ships. There was a need to understand the world — to have complete awareness at a farther range than what they were used to before. … The whole fleet intelligence process was geared around having the red picture, the white picture, the blue picture. … It was a little bit disjointed on the Navy side at first, but in the late 1990s we partnered with the Coast Guard guys and it came out of the counterdrug effort."

Wright said MDA is complex because no one agency can do all the work, with the Navy, Coast Guard and other agencies like Customs and Border Protection all contributing to the picture.

"It has always been a team sport," Wright said. "What has gotten interesting over the last couple of years is people who don't necessarily think about maritime all the time realize that the maritime is a mode of conveyance that they need to be concerned about. The U.S. government does a much better job on interagency-type operations than a lot of people may give us credit for. Mostly, it is 20-25 years of this DoD/IC/law enforcement/federal law enforcement working counterdrugs, working counterproliferation, immigration issues. A DoD person is actually fairly comfortable with working with law enforcement. They understand that, 'hey, we provide the information and they use their authorities to execute the mission.' That is a good division of labor."

The vast amount of information collected in the MDA effort is daunting and includes sightings, radar contacts, satellite imagery, signals intelligence (SIGINT), human intelligence, Automatic Information System (AIS) data, port arrivals and departures, cargo information, passenger and crew manifests — the list seems endless. But the challenge of sorting through the data to find

U.S. NAVY

The MQ-4C Triton unmanned aircraft completed its 100th flight Oct. 17 from Naval Air Station Patuxent River, Md. Triton flew over the newly commissioned guided-missile destroyer USS *Zumwalt* while it traveled across the Chesapeake Bay. When fully operational, Triton will provide 24/7 intelligence, surveillance and reconnaissance for the U.S. Navy.

"The maritime world is a fairly transparent world. The issue is how you manage all that data. Some of the things that we're doing is taking advantage of commercial technologies like the cloud to transport data, trying to get it into one big bucket. Then, when you do that, there are some beautiful things that can happen. You can start running algorithms."

— LYNN WRIGHT, DEPUTY DIRECTOR OF NAVAL INTELLIGENCE AND DIRECTOR OF THE DoD'S MDA OFFICE

threat information faster than before is going to require development of algorithms to help humans rapidly sort the data.

Enright, Wright's deputy, affirmed that "big data" was a challenge. "How do you deal with it without getting into information overload?" he asked rhetorically.

"We have a long history of taking that data in, tagging it and then putting it in databases," Wright said. "What has changed over the last 10-15 years is the importance of inputs that we receive from our partners, allies and commercial providers. In the old days, it might be looking at the shipping news and seeing the port-arrival reporting and databasing that. With the advent of technology and the safety of life at sea requirements for AIS, and with the advent of commercial satellite systems — essentially conducting SIGINT, you could get global AIS reports.

"The maritime world is a fairly transparent world. The issue is how you manage all that data. Some of the things that we're doing is taking advantage of commercial technologies like the cloud to transport data, trying to get it into one big bucket. Then, when you do that, there are some beautiful things that can happen. You can start running algorithms," she said.

"If an area is off limits to commercial fishing, for example, unidentified contacts need to be identified as either a cargo vessel or a pleasure craft," she said. If it continues to be an unidentified target, then it could be an illegal fishing boat.

"At that point, you provide a very precise set of targeting data to the host-nation coast guard, the host-nation navy," she said. "It allows you to cover thousands and thousands of square nautical miles of ocean in a very efficient manner."

Wright pointed out the fundamental difference between surveillance of a possible terrorist haven on land and maritime surveillance.

"If you're using your Reapers and Predators [unmanned aerial vehicles] over southern Afghanistan and you want to look at a compound and do patterns-of-life [analysis] — how many people go in, how many people go out, when do they put the laundry up, how many kids live there, these things that you've got to know over time — you've got to have a human being looking at all of that video all the time," she said. "In the maritime environment, if you combine electro-optical with radar, do you need to have an eyeball looking at open ocean all the time? Or can you put an algorithm in the sensor and say 'chip out the picture that the radar tells me where there is iron [a vessel] in water and then geolocate that piece of iron in the water.' In the maritime environment, because of the distances involved, we have to make a much higher use of algorithms and thinking how you match up sensors to reduce the workload on the people who are doing the exploitation.

"The beauty of maritime intelligence is the layering of the sources on top to determine what the real location is," she said, noting that AIS information is not always truthful.

"We, in naval intelligence, know that people lie," Wright said. "So, it's important to take AIS with a grain of salt. You've got to have a picture, you've got to have other types of sightings. You just layer all that information on top of each other and that way you have increasing confidence of the identification. That is where big data can help us and where smart user algorithms can help us keep track of that. If you sight somebody who is of a certain size and there is no AIS reporting for that, then why is that? Is their AIS broken? Does it look like it is a legitimate boat? It becomes suspicious."

One of the areas of recent MDA application has been in counterpiracy, including kidnapping for ransom, in the Arabian Sea, Strait of Malacca and the Gulf of Guinea.

"Each place is different and it requires sort of a different understanding and a different way of operating," Wright said. "But the baseline condition is that you need to understand what boats are out there, what vessels are moving. You will need to have some understanding of what the cargo is. It would be really great if you know who the crew is. And you need to be able to share information in a manner of the lowest common denominator, but still detailed enough to be useful. If you meet those conditions, then it is very easy if you focus operational assets, to beat down the piracy problem or a maritime crime problem."

U.S. COAST GUARD

A Coast Guard small boat crew approaches the fishing vessel *Kimmy 1* to recover a boarding team from the Island-class Patrol Boat *Kiska* in the Pacific Ocean April 9. Over eight days, the crew spent 126 hours enforcing fisheries laws by patrolling the region and conducting two boardings approximately 300 miles from the Hawaiian Islands, ensuring the sustainability of fisheries in the Pacific.

Dark Targets

Beaton pointed out that as the MDA concept matures, there has been a closer relationship between operational situational awareness and intelligence collection.

"About 2010-2011, people realized there was a lot of duplication of effort in, really, situational awareness and intelligence, with two sides of the MDA coin," he said.

Beaton gave an example of a P-3 patrol aircraft locating and identifying ships, building situational awareness and connecting the dots.

"But to understand which one of those dots constitutes a threat requires knowing the intent of what might be on there, or who is on there. That requires intelligence," he said. "To have that effective understanding [of MDA], not only do you have to know where the dots on the map are, but you have to know if there is something bad in one of those dots that may constitute a threat to you. That takes the intelligence need fused into situational awareness to create real MDA or effective understanding."

Beaton, a former naval aviator, explained the difficulties of searching the ocean.

"The reality is, the physics aren't there to track vessels unless you're looking down from space, so it is really hard to be able to track vessels out in the middle of the open ocean and it's even harder when they turn off their [AIS] transponders," he said. "How do you track those vessels? The No. 1 MDA challenge is small, dark, nonemitting vessels operating either in the open ocean or in coastal regions or ports or harbors. Whether it's in close or far away, if they're not squawking or talking, they're really hard to find."

The National MDA Plan lists 20 challenges, with the main concern being "awareness of 'dark targets,' those vessels that do not broadcast their whereabouts, either because they are not required to or because they wish to avoid recognition," Blaney said. "Closely related to this is the lack of sensors to provide total coverage in our ports and waterways, and our limited awareness of the intentions of the millions of vessels, people and cargoes that ply the world's oceans and waterways."

Beaton said that 95 percent of MDA data comes from unclassified sources: commercial vessels transiting the ocean, cargo manifests and crew and passenger manifests that have to be transmitted to every country 96 hours in advance as the ships come to ports.

"It's not the ships that we're worried about, it's the cargo and the people on the ships that can really constitute the threat," he said. "You have to know where the ship is and where it's going … what's on the ship and who is on the ship to understand the threat that could present."

MDA also "is sorting out that illicit behavior from all those people who are law abiding, following the regulations kind of commercial traffic," Beaton said.

He noted a hypothetical example of illegal fishing, where a boatload of Patagonian toothfish — Chilean sea bass — could be worth $3 million.

"Illegal fishing is big business," he said. "The organizations that fund illegal fishing are transnational organized crime guys who use the money from the fishing to run guns or drugs. It all ties into the nexus of transnational organized crime and terrorism. The illegal fishers are going to be hiding. One, you have to find them and, two, you have to determine are they really a bad guy or not a bad guy, or are they just being stupid and not transmitting."

The U.S. operational and intelligence agencies have been fostering more cooperation with foreign partners and have achieved successes in policing the maritime domain.

Joseph E. Milligan, deputy director, Office of the DoD Executive Agent for Maritime Domain Awareness, told of a recent successful operation, without revealing the identities of the participating partners.

"Country A shared info with us," he said. "The U.S. looked into it, saw a threat, and asked Country B to intervene. It got Country C involved, and Country D intercepted [the target] with their constabulary forces.

"These things [the sharing of MDA information] are making a real difference," said Milligan, who also noted that the distinction between operators and intelligence is being narrowed by MDA, which he termed "one of the nice benefits of MDA."

Enright noted the rise of MDA to the forefront of international interest in the nations bordering the South China Sea, given the Chinese build-up of bases on some reefs amidst the territorial multiple claims of the various nations. The importance of MDA was discussed by Defense Secretary Ashton Carter and Adm. Harry Harris, commander, U.S. Pacific Command, in a September meeting with representatives of the Association of Southeast Asian Nations.

"MDA gives combatant commanders and the secretary of defense something specific they can offer [to foreign partners]," Enright said. "We've all got to have a common operating picture. We need to have a single point of contact."

Vessel of Interest Lexicon

One advantage in coordinating MDA among national and international stakeholders is the establishment of a common lexicon to designate vessels of interest, or VOIs.

On Aug. 11, NMIO Director Sharp announced the VOI Lexicon as the latest tool for communicating potential maritime threats and coordinating rapid, appropriate responses to suspicious vessels in the maritime domain.

The lexicon "will be available for use by all U.S. maritime stakeholder federal departments, agencies, and law enforcement entities," the release said. "The lexicon enables quick synthesis of a large data set by instituting an easily and commonly understood categorization and naming convention.

U.S. NAVY

Gabon Navy Sailors and Gendarmerie members conduct a boarding exercise aboard the expeditionary fast transport USNS *Spearhead* during exercise Obangame/Saharan Express 2016 March 19 in the Gulf of Guinea. Obangame/Saharan Express, one of three African regional express series exercises facilitated by U.S. Naval Forces Europe-Africa/U.S. Sixth Fleet, seeks to increase regional cooperation, maritime domain awareness, information-sharing practices and improve interoperability among participating forces in order to enhance maritime security and regional economic stability.

"Alerts using the VOI Lexicon's alphanumeric code provide a concise picture of the potential threat to the maritime communities, and enable enforcement agencies to help prevent, mitigate, or respond to a threat," the release said. "NMIO will work closely with federal, state, local, tribal, territorial, and law enforcement professionals to coordinate and promote the implementation of this tool."

The VOI Lexicon's abbreviated designators consist of a three-digit alphanumeric code consisting of:

- A number representing the category (e.g., national security, law enforcement, or regulatory).
- A letter representing the subcategory (e.g., terrorism, narcotics, proliferation).
- A number representing the threat level (optional for Category 3 (Regulatory) VOIs); so 1A1 would be "National Security Category; Terrorism;" assessed as possessing the capability and intent of engaging in terrorism.

"This National Lexicon already has proven its effectiveness," Sharp said in the release. "It is a virtual copy of the [North American Air Defense Command/U.S. Northern Command] Vessel of Interest Lexicon, which has been used successfully and collaboratively since 2008 by the U.S. Navy, U.S. Coast Guard and our Canadian counterpart agencies. This is a really positive move forward for the entire maritime community, and will provide an unprecedented level of communication and cooperation across our nation's maritime first responders."

Sharp said the United States is working on a plan to expand the VOI Lexicon as a "collaborative tool for enhanced maritime information sharing between the United States and our allies of Australia, Canada, New Zealand and the United Kingdom."

Nicholas Andersen, Chief Information Officer for the Navy's Intelligence Community, stressed the importance of common data standards, which he said would be helped by use of the VOI Lexicon.

"By using a common way of speaking, you don't lose time," Andersen said, noting that time was of the essence in countering potential threats on or coming from the oceans.

One decision yet to be made is the level at which the VOI classifications are assigned to a vessel, said Milligan. He said the challenge will be to implement the lexicon among all of the stakeholders.

Enright said the lexicon will become an annex to the National MDA Plan and therefore to be used by all applicable agencies, and not just the main stakeholders — the Navy, Coast Guard and MARAD. He said that Northern Command will be the starting point for implementing the new lexicon at the combatant commander level. ■

The Threat Remains

Navy sees the Pacific as area of concern for proliferation of WMDs

By DANIEL P. TAYLOR, Special Correspondent

Serious Business

Recent provocation in the Asia-Pacific gives the Navy cause for concern with regard to weapons of mass destruction (WMDs).

- Singapore hosted a Proliferation Security Initiative (PSI) exercise called "Deep Sabre" for more than 800 personnel from 21 countries.
- The exercise promoted collaboration between the United States and its allies in the region.
- PSI activities require coordination across the community of allied partners, whether that be diplomatic, commerce, customs or law enforcement.

Weapons of mass destruction (WMDs) remain a concern for the U.S. Navy more than a decade after the invasion of Iraq, and now the focus is squarely on the Pacific.

The term may seem like a relic from the days of President George W. Bush's administration, but for the U.S. Navy, it still is very serious business. And a recent exercise in Singapore shows just how much the threat has changed in the last decade-plus.

The Proliferation Security Initiative (PSI) was launched in 2003 as part of a "global effort to stop trafficking of weapons of mass destruction, their delivery systems, and related materials to and from states and non-state actors of proliferation concern," according to a description on the Department of State's website. Back then, Saddam Hussein's supposed WMD stockpile in Iraq was the big concern. But as with most everything when it comes to the Navy, the new focus is in the Pacific.

Singapore hosted the PSI exercise "Deep Sabre" from Sept. 27-30, and more than 800 personnel from 21 countries were on hand to participate. The exercise is designed to promote collaboration between the United States and its allies in the region.

Wendin Smith, the deputy assistant secretary of defense for countering weapons of mass destruction, said at a Sept. 29 briefing that the Asia-Pacific region "really could not be more important from a counterproliferation and a non-proliferation perspective.

"I think, daily, we see that evidence in recent provocations in the area, continued importance of WMD proliferation, related both to materials, delivery systems, people, proliferation networks, etc.," Smith said, not mentioning the most obvious regional concern — North Korea — by name. "It's a very complex topic, but this area in particular is just critical."

Smith added that PSI activities require coordination across the community of allied partners, whether that be diplomatic, commerce, customs or law enforcement. And in Southeast Asia, the operation couldn't be more important, he argued.

"The entire Asian region, with so many shipping channels and transit routes, is incredibly important," Smith said. "And, therefore, from a WMD proliferation and a network perspective, the shipment of goods is critical both from economic perspectives, in the sense of ensuring the safe and efficient transport of those goods, but also then to make sure that that is not being used to proliferate a network of concern."

This particular exercise involved a tabletop policy simulation in a scenario where a merchant vessel suspected of carrying illegal WMD-related materials is stopped by authorities.

"Deep Sabre continues to evolve so that training and scenarios match real-world threats and contingencies," Navy spokesman Lt. Arlo Abrahamson said in an e-mail response to *Seapower* questions. "The exercise continues to have a maritime and shore dynamic that encompasses

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the domains where proliferation remains a concern. What's different is that each year lessons learned are applied from the training scenarios to make follow-on training more complex and more realistic."

Abrahamson added that while there was no certainty the participating nation list would continue to expand, the trend indicates that "more nations are endorsing the PSI initiative."

Michael O'Hanlon, a senior fellow at the Brookings Institution, a Washington think tank, said that WMDs had indeed seemed to have fallen out of public interest in the years since the Bush administration, but remain a significant concern.

"We get obsessed with a given problem, then we sort of forget about it," O'Hanlon said. "This is sort of the case with biological weapons. We had the anthrax scare in 2001, we thought a bit about biological weapons and advanced pathogens, we've had a lot of breakouts of naturally occurring viruses since then like West Nile, avian flu and, obviously, Ebola, but we haven't really been able to whip ourselves into the same hysteria as 2001."

While hysteria is not exactly the answer, the concern should certainly be greater in 2016, as biological technology has advanced since 2001, O'Hanlon noted.

"The threat is undoubtedly greater," he said. "We don't talk about it."

And then there are nuclear weapons, the fear that never goes away. While technology has not really advanced much in the last decade or so in this area, there are reasons to have greater concerns about nukes, O'Hanlon said, due to a "big proliferation" on the part of both Pakistan and North Korea. And that does not even factor in Russia's recent behavior, he added.

"In some sense, Russia has put nuclear politics and nuclear brinksmanship back on the table in terms of international interactions in major states," O'Hanlon said.

There is less concern that terrorist groups will get their hands on a WMD, he noted.

"We've gotten a little less paranoid about al-Qaida or ISIS [the Islamic State in Iraq and Syria]," he said. "There was a moment back in the early 2000s when the Bush administration thought a nuclear weapon might be sitting in lower Manhattan about to go off. We haven't really seen that kind of debate, at least publicly."

So who is the biggest threat when it comes to WMDs? North Korea probably tops the list due to their frequent nuclear tests and rhetoric, O'Hanlon argued.

"In some ways, they may be more dangerous than Middle Eastern [threats]," he said, noting that for some reason Republicans have not criticized President Barack Obama more for the North Korean situation due to the fact that the state has tested a nuclear weapon four times during his presidency, and probably expanded its arsenal by about 10 bombs or so.

So can exercises like Deep Sabre and the U.S. Navy really do much about this proliferation? O'Hanlon said it would be difficult, to say the least.

"It's very hard for a navy to do anything to control the spread of weapons," he said. "Certainly, you can control or try to track and preempt delivery vehicles if you're worried about a ship actually being the way a nuclear weapon is delivered. But the detectors are short range, and nuclear weapons do not give off a long-range signature. And if they're covered in lead, you've got to be extremely close."

That said, these exercises have their uses, he argued.

"It's not like anyone thinks that if the Navy gets good enough at this kind of operation, that we can stop Pakistani and North Korean nuclear programs," he said. "It might improve our odds to stop shipments to terrorist groups, so if North Korea somehow is trying to export materials, and had reason to suspect a given ship," it could conceivably be stopped, he added. ■

U.S. NAVY

A U.S. Coast Guard Maritime Safety Security Team Maritime Law Enforcement Force Protection member clears the main deck of USNS *Henry J. Kaiser* during an exercise at sea off Hawaii for Fortune Guard 2014, which was designed to build regional weapons of mass destruction counterproliferation capacity and long-term commitment to the Proliferation Security Initiative in the Indo-Asia-Pacific. The recent "Deep Sabre" tabletop exercise in Singapore included participants from 21 nations.

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New Blueprint

Marine Corps launches, tests concept for operating against future adversaries in the new security environment

By OTTO KREISHER, Special Correspondent

The Way Forward

After 15 years of fighting a low-tech insurgency, the new "Marine Corps Operating Concept" (MOC) intends to re-examine the service's organization, training and warfighting tactics, and make the changes necessary to fight an adversary with electronic warfare and sophisticated technological capabilities.

- The MOC expands the traditional concepts of both maneuver warfare and combined arms by adding cyber and information operations.
- It also envisions new concepts of expeditionary operations including widely distributed, self-reliant fighting units and the use of Marine landing forces to help the Navy counter the anti-access, area-denial threat.
- A multiyear series of experiments and exercises called Sea Dragon will be conducted to develop the technologies, organizations and operating concepts needed to meet the MOC's goals.

To prepare to fight a potential future adversary with matching technological capabilities, the Marine Corps has adopted a dramatically new operational blueprint and is launching an extensive series of exercises and experiments to test the tools, tactics and organizations it will need to execute that warfighting scheme.

Undramatically labeled the "Marine Corps Operating Concept" (MOC), it is subtitled "How an Expeditionary Force Operates in the 21st Century."

In his forward to the MOC, Marine Corps Commandant Gen. Robert B. Neller said it "embraces our naval character, expeditionary mindset and professional approach to constantly improve and build on our foundations of maneuver warfare and fighting as a combined arms force."

But it would expand the traditional concepts of both maneuver warfare and combined arms by adding cyber and information operations to the standard elements of rapid movement around enemy strong points and the kinetic tools of infantry, armor, artillery and air.

The MOC also envisions broad new concepts of expeditionary operations including widely distributed, self-reliant fighting units and the use of Marine landing forces to help the Navy counter the anti-access, area-denial threat to its ability to project power, a reversal of the historic pattern.

The MOC is a replacement for the "Expeditionary Force 21" document released in 2014 under then-Commandant Gen. James A. Amos, which primarily focused on developing a force able to meet 21st-century security challenges.

In releasing the MOC on Sept. 27, Neller said, "This is more about how we will operate … against a future adversary," and the capacity, capabilities and skill sets that will be required for that new security environment.

Although there is an extensive discussion of technology, organization and operational concepts in the forward, the commandant also recognized the brutal nature of war and the Corps' traditional reliance on its people.

"The profession of arms is unforgiving; mistakes are paid for in blood and incompetence can lead to catastrophic defeat. When we fight, we must win. There is no alternative," he said.

"Even in a world of ever-increasing technology, we must continue to provide combat formations capable of closing with and destroying the enemy. This imperative drives us to demand physical toughness and resilience in our Marines and Sailors, and expect their brilliance in the fundamentals of warfighting."

In presenting the MOC to assembled Marines at Marine Corps Base Quantico, Va., Neller assured them

U.S. MARINE CORPS

Cpl. Zachary Aguilar, a Marine telephone system and personal computer repairer, contacts the combat operations center during Exercise Predator Strike at Cultana Training Area, Australia, June 9. A primary focus of the new "Marine Corps Operating Concept" is preparing Marines to fight a potential future adversary with matching technological capabilities or the ability to deny U.S. forces their communications advantage.

the new concept did not mean that the Corps was "broken" or "all hosed up."

Instead, he said, a new approach was needed because for 15 years Marines had been fighting a tenacious but low-tech insurgency that did not have electronic warfare capabilities, or an air force, "didn't have the ability to take down our networks, to deny our comms [communications]" and "didn't have a sophisticated information operations plan to deceive not only us, but our citizens."

What the MOC intends to do, Neller said, is to re-examine the service's organization, training and warfighting tactics and make the changes necessary so if it has to fight someone who has those capabilities, every Marine has what is needed "to make sure it's not a fair fight."

The MOC was drafted, on Neller's directions, by the Ellis Group, a group of forward-looking current and former Marines from all operational specialties named for Lt. Col. Earl "Pete" Ellis who, during the 1920s, secretly studied Imperial Japan's emerging military capabilities and plans and drafted what is considered the blueprint for the Marines' World War II island-hopping campaign.

The MOC sets the stage for its guiding principles and directives by describing the challenging global security environment the Marines could face in 2025, developed from the findings of the Marine Intelligence Activity, said Doug King, a retired Marine officer now the Ellis Group's director. The group then conducted numerous war games testing various forms of Marine combat forces against a variety of opponents in that future security environment, he said.

Those produced the "key drivers of change" that include facing "complex terrain" consisting of congested urban areas, mostly on a coastline; technology proliferation; information as a weapon; the "battle of signatures," which means managing electromagnetic transmissions; an increasingly contested maritime domain, and interference with the space-based precision navigation and global communications capabilities U.S. forces now depend on.

It then presents a "statement of the central problem," which is that after 15 years of mainly counterinsurgency operations, the potential near-peer adversaries have developed the means to counter America's military advantages and the Corps is "not organized, trained and equipped" to meet those challenges.

The MOC then goes into how to execute the concept and assigns a long list of "critical tasks" necessary to create the force needed to counter the predicted threats. That includes the ability to conduct "maneuver warfare in every dimension, combined arms in all domains."

In his Quantico speech, Neller noted that in the guidance he issued on taking office last year he called for a return to maneuver warfare, which seeks to defeat an enemy's cohesion.

"You can do that by closing with and destroying" the enemy force, but he added, information warfare and cyber operations also can provide an effect and can prevent a fight.

"Maneuver warfare is about the cognitive domain," Neller said, warning that Marines would have to fight in six domains: land, sea, air, space, cyberspace and information.

The "critical tasks" the MOC advocates include integrating the naval force "to fight at and from the sea," which includes Marine forces afloat helping to protect the naval forces with intelligence and reconnaissance efforts and defensive fires, and contributing to sea control with anti-surface fires, as well as projecting forces ashore to eliminate land-based defenses and controlling coastal terrain by establishing "expeditionary advanced bases."

It also prescribed continuing an enduring Marine Corps goal — "Exploit the Competence of the Individual Marine" — by seeking to recruit "high-quality human

capital," train and educate them to serve in the integrated naval force and deal with complexity, and to "develop leaders at every level."

Another critical task is to evolve the Marine Air-Ground Task Force (MAGTF) to operate in the difficult emerging security environment, including as "distributable forces" to avoid a mass that would make an easy target, which requires smaller units able to function with minimal logistic support and direction from higher command. The evolved MAGTF also must be able to exploit emerging automation by using unmanned systems and "manned-unmanned teaming."

In an Oct. 25 speech at the AUVSI Unmanned Systems Defense conference in Arlington, Va., Lt. Gen. Robert S. Walsh, the deputy commandant for combat development and integration, said cheap unmanned systems would enable a small Marine force to employ "mass" against an enemy and allow expeditionary forces to maneuver faster. he said an initial step would be to provide small, hand-launched unmanned aerial systems (UASs) to every squad in four infantry battalions within a year. Tests of those systems would help determine what kind of UAS might be provided for the remaining squads.

Another critical task the MOC prescribes is developing the ability to operate in a "contested network environment," which means the degradation in communications, intelligence and precision navigation information due to enemy interference.

Walsh, who will be one of the key leaders in working to meet the MOC's goals, told reporters following Neller's Quantico speech that the commandant had ordered him, the Marine Corps Warfighting Laboratory and other organizations to conduct a multiyear series of experiments and exercises called Sea Dragon to develop the technologies, organizations and operating concepts needed.

As part of the Sea Dragon initiative, Neller designated the 3rd Battalion, 5th Marines, as an experimental unit to test equipment, tactics and organization even while deployed as an operational force with the 31st Marine Expeditionary Unit in Okinawa, Japan.

A company from 3/5 started the process as part of the Warfighting Lab's MAGTF Integrated Experiment 16 (MIX-16) in July and August, in which it employed more than a dozen unfamiliar unmanned air and ground systems and other prototype systems during an air-transported assault from Camp Pendleton to the Marine Corps Air Ground Combat Center in California and attacks against an opposing force using high-tech systems.

Brig. Gen. Julian D. Alford, the lab's commanding general, said it would be doing even more challenging experiments next year in MIX-17, and would conduct a series of war games and lesser experiments to set the stage for that.

"That all is being fed into the campaign of learning" that the commandant ordered, Alford said.

Walsh said the need for experimentation has been embraced by other operational commands, including the 2nd Marine Expeditionary Force, which is working with Fleet Forces Command to plan Bold Alligator 2017 on the Atlantic Coast, set to be the largest, most complex amphibious/expeditionary operation in decades.

Alford, joining in Walsh's session with reporters, said he was working to include Marine Experimental Squadron One (VMX-1), based at Yuma, Ariz., in future experiments to better test new MAGTF operational concepts. VMX-1 has nearly every type of Marine Corps fixed-wing aircraft, helicopters and the tiltrotor MV-22. By adding those aviation elements to ground combat units, "we can see the synergy of marrying those two forces together," he said.

In recognition of the Corps' always-tight budget conditions, Alford said he would make greater use of simulation in the lab's experiments.

The Marines have been training their infantry in immersion trainers, which can pit small Marine units against avatars in a simulated combat-like setting, but Alford said he would like to do that at the battalion level. And, while a battalion commander "spends a lot of time figuring out how to train his Marines, we need to figure out how to train those leaders."

To do that, he said Marine officials went to the computer gaming industry to help develop ways to train commanders and staff officers in live, constructive and simulated environments. ■

U.S. MARINE CORPS

A Marine with Kilo Company, 3rd Battalion, 5th Marine Regiment, assists his squad by providing reconnaissance with an "Instant Eye" unmanned aerial system at Marine Corps Air Ground Combat Center Twentynine Palms, Calif., Aug. 5. The system was built by the Marine Corps Warfighting Laboratory, which conducted a Marine Air-Ground Task Force Integrated Experiment exercise to explore new gear and assess their capabilities for potential future use.


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Autonomous Care

Marines, ONR work to develop high-tech system to help monitor, stabilize casualties in the field

By GIDGET FUENTES, Special Correspondent

RoboMedic?

The Office of Naval Research and the Marine Corps are experimenting to develop a small, ruggedized autonomous device that can serve as an "ICU on the go" to treat and stabilize patients during transport across an austere or remote battlespace en route to higher-level care.

- The Autonomous Critical Care System, or ACCS, is a closed-loop system — much like a house thermostat — that can deliver intravenous fluids, oxygen, medication and stabilize blood pressure, as well as provide real-time medical information and tracking throughout transport on military vehicles and aircraft and to sea base.
- The suitcase-sized device will not replace the hospital corpsman, nurse or physician en route — at least for now, officials say — but augment the medical capability to stabilize the patient, particularly stemming bleeding.
- Officials hope to use the ACCS with real-time in-flight monitoring and tracking during next year's Bold Alligator exercise on the East Coast, and plan for future experiments with ACCS in casualty evacuations using unmanned aerial and ground vehicles.

Marines and a Navy hospital corpsman strapped the casualty onto a litter and placed him aboard an MV-22 Osprey tiltrotor aircraft for the medical evacuation from the battlefield. When the Osprey touched down on the landing zone, other Marines clipped the litter onto the back of a Polaris MRZR offroad vehicle and sped the patient down a hill to the nearest forward resuscitative surgical section.

Throughout that transport, clipped in and under the litter, the Autonomous Critical Care System (ACCS) monitored the patient's vital signs and delivered, when needed, lifesaving doses of intravenous fluid and oxygen — and at times, by design, without the hands-on actions of a corpsman or physician.

That scenario, conducted during a summer desert exercise at Marine Corps Air Ground Combat Center in Twentynine Palms, Calif., experimented with one of the latest high-tech advances in battlefield care.

The ACCS, under development by the Office of Naval Research (ONR), can deliver intravenous fluids, oxygen, medication and stabilize blood pressure, as well provide real-time medical information and tracking throughout transport on military vehicles and aircraft and to sea base. At 22 pounds, it is easily transportable and moves with the patient and the standard litter or stretcher, without getting in the way or hampering medical treatment or transport.

Officials said the initial experiment, done simultaneously with the Southern California portion of the 2016 Rim of the Pacific (RIMPAC) exercise, went better than expected.

"We got farther than we wanted to," said Dr. Timothy Bentley, force health protection deputy with ONR. "We wanted to show it to guys who were actually doing field trials of the whole medical support."

The ACCS "monitors the casualty like an ICU [intensive care unit]," Bentley told *Seapower*. "It measures his blood pressure, heart rate, ventilation rate, oxygenation, temperature and cardiac output."

It did not take much to impress the Marines, including those taking the patient to the surgical section, with the potential lifesaving benefit of such an autonomous and portable system. The Marines told Bentley they wished they knew what was going on with the patient — an advanced patient simulator mannequin

U.S. MARINE CORPS

A hospital corpsman assesses a simulated patient during a casualty evacuation drill on Marine Corps Air Station Futenma, Japan, Dec. 8, 2015. The Office of Naval Research and the Marine Corps are experimenting with the Autonomous Critical Care System, a small, ruggedized autonomous device that can treat and stabilize patients during transport across an austere or remote battlespace en route to higher-level care.

known as SimMan — but they had no direct information on how he was doing during the transport.

"So they were really interested in using the capability of the ACCS, or a subsystem called the Wireless Vital Signs Monitor, to keep an eye on the patient while they were moving him in those local areas," he said.

The RIMPAC exercise included ongoing experiments led by the Marine Corps Warfighting Laboratory to develop new technologies like blood storage, patient warming blankets with embedded sensors, semi-autonomous casualty movement and placement of forward resuscitative care closer to small units on the front lines.

All that experimentation comes as the Marine Corps returns to its expeditionary roots. Its refocusing to come "from the sea" to reach 100 miles or more inland with small, dispersed units in austere places also has buoyed Navy medicine's efforts to bolster en-route care between ground forces and the sea base.

Without dedicated airlift like the Army's Blackhawk medical evacuation helicopter fleet, "we have to utilize lifts of opportunity," Bentley said, and provide medical care for prolonged periods ashore and during long evacuation flights to the sea base. It stretches the required care and stabilization longer than that "golden hour" immediately after an injury.

"That becomes more important as we move to the Pacific theater" and in the U.S. Africa Command theater "where the distances are so long, the infrastructure is very limited" and coalition partners may have lesser capabilities, he said. "We have to be able to provide care during these long periods of holding," what's called "prolonged field care," and longer transport times.

Early in the Afghanistan war, patient transport averaged four and a half hours from the time of injury or wounding, Bentley said. More recently, it's 15 to 93 minutes, although in some more austere places, military patients may be held for up to 72 hours before they can be transported out. So ONR wants devices that can help monitor and stabilize a casualty.

"We are not looking to replace the corpsmen or the physicians or the physicians' assistants, but we're trying to make them more capable, so one … man or woman can do more with the tools at hand," Bentley said.

While the ACCS works as a closed-loop system, the Navy still wants the person in the loop. The intention, Bentley said, is that the ACCS computer senses what is going on with the casualty and determines or recom-

mends a therapy. At the highest level, it decides and acts on the casualty without human input, something that the U.S. Food and Drug Administration (FDA) currently does not allow.

"We are working with the other services and with the FDA," he said. "We want to get closed-loop medical therapeutic approved by the FDA" much quicker.

ACCS also provides the patient's information remotely to a receiving facility and is being developed with communications capability to talk with the patient.

"At some point, we will be interacting with the SimMan, so if he makes some kind of negative change, his program says he is bleeding hard or whatever, the ACCS can detect that," he said.

Cardiac output is how much blood the heart pumps in a minute. Bentley said a device that measures and monitors that "currently doesn't exist in the field at all."

That vital sign is significant, especially on the battlefield where many wounds cause massive blood loss. Without sufficient resuscitation or measures like tourniquets or blood-clotting bandages, hemorrhaging patients face lower rates of survival.

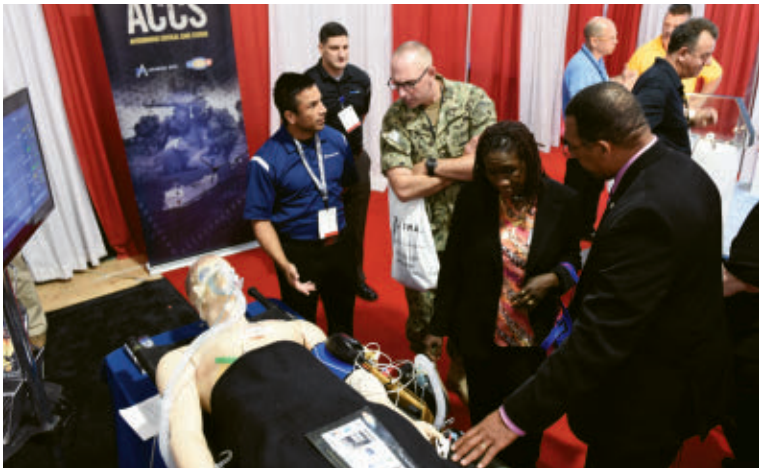
"Almost all of the people who could have been saved on the battlefield, in retrospect looking at the casualties from Afghanistan and Iraq, died of bleeding to death," Bentley said.

Currently, there is no snapshot picture of what is happening to a patient throughout the transport, said Christopher Santee, a retired master chief and hospital corpsman and support contractor with ONR's Warfighter Performance Science and Technology Department. With the ACCS, "now we can have a bigger plot to show this is what the guy did during this whole time."

Officials envision the data collection and patient monitoring will serve as a "decision assist" to help corpsmen, physicians and other medical providers stabilize and treat patients.

Corpsmen and trauma providers can take different measures to stabilize casualties and control blood pressure, which in turn can lessen hemorrhaging, but they also must maintain other vital signs, some of which might not be as obvious. Medical devices like ACCS can assist them by providing various data such as how much oxygen or red blood cells are in the blood and whether a patient has received too much fluid and risks drowning from the inside out, Bentley said.

The ACCS can share that data via the Medical COP, or common operating picture, accessible to providers and commanders on the ground and at the sea base, helping manage patients and steer them to the proper level of care. A tablet can coordinate patients with several ACCS devices into something like a triage or nurses' station and help manage transport, which "frees up people to do more interactive, human-oriented care," Bentley said.



U.S. NAVY

Eugene Daniels, right, a contractor with the Office of Naval Research, explains the Autonomous Critical Care System (ACCS) to attendees during the Modern Day Marine Expo at Marine Corps Base, Quantico, Va., in June 2015. The ACCS can deliver intravenous fluids, oxygen, medication and stabilize blood pressure, as well as provide real-time medical information and tracking throughout a patient's transport.

"It will never replace" the person, he added. "The machine will never be the same as the educated, capable physician or IDC [independent duty corpsman]. Yet, at some point, it may have some more knowledge than buddy aid, for instance."

For the summer experiment, ONR did not have airworthiness certification approval to use the ACCS actively on the MV-22, so real-time vital signs and electronic data from the SimMan patient could not be transmitted and shared. ONR is working with Naval Air Systems Command at Patuxent River, Md., to get the certification for testing during next summer's Bold Alligator exercise, Bentley said. Meanwhile, ACCS might be used for some testing and development with an MV-22 Osprey mockup fuselage at Naval Medical Center San Diego, he said.

ONR had planned to test the ACCS aboard a ship during RIMPAC but the ship was not available. For Bold Alligator 2017, "we want to do the same form and fit and function or flow aboard ships," Bentley said. "We want to be able to move it on and off ships with helicopters or MV-22s. We want to be able to move from shore to ship, perhaps from ship to shore again with the communications capabilities on. And if we're ready, we would like for SimMan to be cared for by the ACCS, even if it's a very scripted care."

For Bold Alligator, ONR also wants to demonstrate its form or fit with autonomous ground and air vehicles, perhaps a quad copter.

"We want to get it to a location and then start to understand what are the limitations on the vehicle," Bentley said.

Carrying casualties via drones?

"Absolutely by autonomous air," Bentley said. "That's a concept that we're working on. That's of interest across DoD."

A working group is looking at the limitations and restrictions.

"One question is, is it ethical? Could you put a person in a machine and have it leave you?" he said.

In mid-October, the Navy joined with the Army and Air Force in a demonstration at Fort Dix, N.J., that paired an unmanned K-Max helicopter and a robotic, autonomous ground vehicle to evacuate a stretcher-borne mannequin. And while larger unmanned aerial vehicles could carry patients, ONR sees smaller drones useful to transport medical supplies.

One lesson from the RIMPAC experiment is that the anesthesia and sedation capability might work better outside the ACCS, Bentley said, perhaps as an optional modular device attached by a cable.

"That way, we can mix and match a little bit," he said, noting not all casualties will require anesthesia or sedation. If one piece breaks, it can be replaced, he noted, although having separable parts also can make it harder to ensure no piece is missing.

A clinical trial already is looking at the sedation system and how it can determine the depth of a patient's sedation, something difficult to determine and monitor.

"This system has a way to quantify that based on how the brain is working," Bentley said. It also may guard against too much anesthesia being used. The trial also will look at whether it can supply anesthesia, which could support surgery if the casualty "takes a turn for the worse" or is held longer and surgery is needed, he said.

The sedation and anesthesia would be delivered via IV, rather than a mask, a method commonly used in Europe but not in the United States.

ONR continues to develop the system and harden it for expeditionary use but without adding much more weight, Bentley said. It plans to build in some longer-distance communication capabilities that work over Navy and Marine Corps, and then Army and Air Force radio systems.

It may be at least two years before the ACCS reaches advanced development and obtains required FDA approvals. ■

JPALS to Guide F-35, MQ-25 To Shipboard Landings

BACKGROUND

The Joint Precision Approach and Landing System (JPALS) is designed by Raytheon to guide aircraft to precision landings on an aircraft carrier or amphibious assault ship in any environment. The program, initially joint, now is Navy-sponsored.

SCOPE

The JPALS was envisioned for back-fit into existing carrier aircraft, but now is focused on the F-35B/C Lightning II joint strike fighter and MQ-25A Stingray unmanned carrier aerial refueling system. The JPALS is expected to equip all production versions of the aircraft as well as other future carrier aircraft.

TIMELINE

The Navy in September awarded Raytheon $255 million for the development and production readiness of JPALS. Rockwell Collins received a $67 million, six-year contract in October from Raytheon to complete the development of JPALS navigation and communication subsystems. JPALS is scheduled to achieve early operational capability in 2018. A decision for low-rate initial production is expected in 2019. Initial operational capability is scheduled for mid-2020.

WHO'S WHO

Bob Delorge is vice president of Transportation and Support Services at Raytheon's Intelligence, Information and Services business and Mark Maselli is the company's JPALS deputy program manager.

U.S. NAVY

An F-35C Lightning II performs an arrested landing on the aircraft carrier USS *George Washington* Aug. 20 in the Atlantic Ocean. The Joint Precision Approach and Landing System is designed to increase the safety and efficiency of carrier flight operations.

"JPALS uses differential GPS [Global Positioning System] signals to guide an aircraft to the deck of a ship with precision in any kind of weather and in darkness. With data links between the aircraft, ship and satellite continuously transmitting faster than a second, the ship's positions are recalculated continuously as the aircraft approaches. The aircraft is not reliant on a ship's radars and beacons.

Under the concept, a signal is broadcast to the aircraft from the ship when the aircraft is 200 nautical miles away. The aircraft logs into the JPALS system at the 60-nautical-mile mark and starts two-way communication with the ship that is accounting for pitch, roll and heave.

At the 10-nautical mile mark, the data transmission speed becomes multiple updates per second, with more data as well. The data link has anti-jam and anti-spoofing capabilities built into it to make it secure.

The original concept was for JPALS to take the aircraft down to 200 feet in altitude before the pilot resumed control. Under the current program, Raytheon will develop the capability for the aircraft — piloted or unmanned — to be guided all the way to the deck.

JPALS has been tested in a Navy F/A-18 Hornet strike fighter, including taking the aircraft to carrier landings. The F/A-18 made 38 landings on a carrier with JPALS. Raytheon has tested JPALS for 40,000 hours over the development program so far.

The goal is that the pilots are going to have a huge increase in confidence knowing that they're going to return from a mission regardless of conditions that they're coming back into. This is a mature solution set that we're putting out there."

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SP1216

Australia Begins Design Activities for Future Submarine

By AMI INTERNATIONAL INC.

The Australian government and France's DCNS have signed the contract to begin the design phase for the Royal Australian Navy's (RAN's) Future Submarine Program (SEA 1000).

The submarine design will be based on the DCNS Shortfin Barracuda. In April, the Australian government announced DCNS had been selected as its international partner for the $38.1 billion Future Submarine. A final design is expected by 2021, with construction on the first hull beginning in 2022.

Australia also announced that Lockheed Martin Australia had been selected as the combat systems integrator for the 12-hull submarine program. Lockheed Martin Australia will work with DCNS and the Australian defense industry to integrate a U.S.-derived combat system solution into the Shortfin Barracuda design, which was one of the major criteria for the hull selection.

Australia's "Defence White Paper 2016," released in February, called for the combat system to consist of an upgraded version of the General Dynamics AN/BYG-1 combat system and the Raytheon Mk 48 Mod 7 heavyweight torpedo.

The first submarines are expected to enter service in the early 2030s, and the program will run through the late 2040s/early 2050s. To ensure there is no capability gap, development of the next-generation submarine will begin by the mid-2050s.

DCNS and Lockheed Martin Canada will be leading Industry Days throughout the next year in Australia in order to maximize Australian industry involvement in the program.

AMI INTERNATIONAL INC.

Two 94-meter vessels for the Philippine Coast Guard may be based on the Japan Coast Guard (JCG) Hateruma-class Offshore Patrol Vessel, shown here. Nine units of the class were built for the JCG at Mitsui Shipyard in Tamano.

Philippines to Acquire Two Coast Guard Vessels

Philippine President Ridrigo Duterte has approved a deal with Japan for the acquisition of two 94-meter vessels for the Philippine Coast Guard (PCG) worth $167.3 million. The Coast Guard program is part of the long-term Maritime Safety Capability Improvement Project.

All Japanese shipyards will be eligible to bid for the program, which will consist of two Multi-Role Response Vessels (MRRVs). The MRRVs may be based on the Japan Coast Guard Hateruma-class Offshore Patrol Vessel (OPV), of which nine units were built at Mitsui Shipyard in Tamano. The ships, commissioned from 2008 through 2010, have a flight deck to operate a medium-sized helicopter. The PCG has a specific requirement for the vessel to operate an EC-145 helicopter.

With the first unit planned for commissioning in November 2020, a final design and shipyard could be selected next year and a contract in place by 2018. The second unit is scheduled to be delivered to the PCG in March 2021. A contract may contain an option for two additional units, as the PCG has a requirement for up to four MRRVs in this size range.

The MRRV will have a top speed of 30 knots and a range of 4,000 nautical miles at 15 knots. It will have the capability to rescue up to 500 passengers in the event of a maritime disaster.

The PCG also has 10 40-Meter MRRVs under contract with Japan Marine United Yokohama Shipyard. The first was delivered to the PCG in early August.

Brazil Signs Deal For LPD, Frigate

The Brazilian Navy (Marinha do Brasil, or MdB) has signed a deal with South Korea's POSCO Daewoo (formerly Daewoo International) worth an estimated $1 billion to provide one Makassar-class landing platform dock (LPD) and one 2,800-ton frigate to the MdB. Brazil's Arsenal do Rio de Janeiro also will be modernized under this deal.

The contract calls for the delivery of one Makassar-class LPD, with potential options for additional units as the MdB has four antiquated large amphibious ships that are in need of replacement. The first LPD will be built by Daewoo Shipbuilding & Marine Engineering (DSME), with any follow-on units built in Brazil with South Korea's assistance, similar to the Peruvian Makassar program. Construction could begin next year.

The contract also calls for the delivery of one 2,800-ton frigate, although more may be ordered at a later date. The MdB has a requirement to replace all six Niteroi-class frigates and three Inhauma-class corvettes.

The 2,800-ton frigate is believed to be based on the DW-3000H frigate design. Construction on the first hull could begin next year at DSME, with commissioning in 2020. Any follow-on units will be built in Brazil. Three optional units may be built under this program, allowing for a future frigate force of four 2,800-ton South Korean frigates as well as four indigenous 2,400-ton Tamandare-class frigates based on the Barroso corvette design.

DNCS Missiles To Arm Italian OPVs

MBDA Italia awarded a contract to DCNS for the supply of missiles and Sylver A50 VLS (Vertical Launching Systems) that will be installed on the Italian Navy's Pattugliatori Polivalenti d'Altura (PPA) OPVs that began construction in 2015.

Each PPA OPV will be fitted with two Sylver A50 eight-cell VLS and be equipped with the MBDA Aster 30 surface-to-air missile, and possibly the future CAMM-ER SAM that is currently in the development stage.

The PPA OPV program will see five units commissioned between 2021 and 2025, along with five units of the PPA frigate program that will be commissioned between 2023 and 2029.

L-3 to Acquire Australia's Micreo

L-3 Communications has entered into an agreement to acquire Micreo Ltd. of Brisbane, Australia, a manufacturer of specialized electronic warfare (EW) subsystems.

Following the acquisition, Micreo will be integrated into the Electronic Systems segment and be renamed L-3 Micreo. The company is expected to generate $27 million in sales for calendar year 2017.

Micreo specializes in products that utilize high-performance microwave, millimeter wave and photonic technology. ■

AMI International Inc., Bremerton, Wash., is an international consulting and naval intelligence services company located on the web at www.amiinter.com.

Ship of Fate in Pearl Harbor

By DAVID F. WINKLER

On the morning of Dec. 7, 1941, the Navy cargo ship *Antares* was approaching the entrance of Pearl Harbor with a barge in tow when a lookout spotted a trailing object in the water. *Antares* signaled the destroyer *Ward*, which was patrolling the approaches of the harbor that morning.

At 0637, the officer of the deck on *Ward* called the captain, Lt. Cmdr. William W. Outerbridge, to the bridge. Outerbridge, seeing a small conning tower with a periscope, ordered general quarters. At 0640, he ordered turns on the shafts for 25 knots and turned the World War I-vintage flush-deck destroyer toward what would later be determined to be a Japanese mini-sub.

NAVAL HISTORICAL AND HERITAGE COMMAND

The destroyer USS *Ward* burns after being hit by a kamikaze aircraft off the Philippines, Dec. 7, 1944. Exactly three years earlier, *Ward* fired the first shot of the Pacific War. This year marks the 75th anniversary of the attack on Pearl Harbor.

Two minutes later, his gun crew from the No. 1 forward 4-inch/50-caliber gun mount fired a shot that passed over the small conning tower. Then the crew from the No. 3 starboard side 4-inch/50-caliber took their turn.

Boatswain's Mate 2nd Class R.H. Knapp was the gun captain. The rest of the crew consisted of Seaman 1st Class C.W. Fenton, Pointer; Seaman 1st Class R.B. Nolde, Trainer; Seaman 1st Class A.A. De Demagall, No. 1 Loader; Seaman 1st Class D.W. Gruening, No. 2 Loader; Seaman 1st Class J.A. Paick, No. 3 Loader; Seaman 1st Class H.P. Flanagan, No. 4 Loader; Gunner's Mate 3rd Class E.J. Bakret, Gunner's Mate; and Coxswain K.C.J. Lasch, Sightsetter.

In his official post-action report, Outerbridge wrote: "The shot from No. 3 gun fired at a range of 560 yards or less struck the submarine at the waterline which was the junction of the hull and coning tower. Damage was seen by several members of the crew. This was a square positive hit. There was no evidence of ricochet. The submarine was seen to heel over to starboard. The projectile was not seen to explode outside the hull of the submarine. There was no splash of any size that might result from an explosion or ricochet. Immediately after being hit the submarine appeared to slow and sink. She ran into our depth charge barrage and appeared to be directly over an exploding charge. The depth charges were set for 100 feet. The submarine sank in 1200 feet of water and could not be located with supersonic detector. There was a large amount of oil on the surface where the depth charges exploded. The attack was made at 0645 which was before Pearl Harbor was bombed by Japanese planes."

In August 2002, the submarine finally was located on the seabed off Oahu by University of Hawaii scientists who confirmed Outerbridge's assessment, finding a shell hole on the starboard side of the conning tower.

Of note, the No. 3 gun crew on *Ward* were all Naval Reservists who a year before had been drilling at the Naval Reserve Training Center in St. Paul, Minn. Fittingly, today that gun can be found at the capitol mall of that city. That the gun survived to eventually be placed on permanent display can be credited to a decision to convert *Ward* into a fast attack troopship.

During the conversion process on the West Coast in 1942, the 4-inch mount was removed to accommodate more anti-aircraft armaments. Those guns would help fend off a Japanese air attack against Tulagi in April 1943 as the veteran warship would participate in numerous amphibious operations in the Southwest Pacific that year.

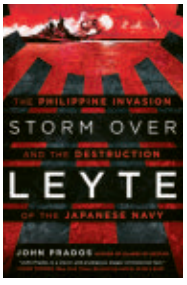
With unfortunate irony, while patrolling off the beaches of Ormoc Bay in the Philippines on Dec. 7, 1944, those AA guns could not stop a Japanese kamikaze aircraft from hitting amidships, eventually forcing the surviving crew to abandon ship. A blazing hulk, the ship was scuttled by gunfire from the destroyer *O'Brien*. That somber duty must have been an emotional one for *O'Brien*'s commanding officer — William W. Outerbridge. ■

Source: *David F. Winkler,* "Ready Then, Ready Now, Ready Always: More than a Century of Service by Citizen Sailors," *Navy Reserve Centennial Committee, Washington, D.C. (2014).*

Dr. David F. Winkler is a historian with the Naval Historical Foundation.

Books Highlight Pacific War, War of 1812 in Chesapeake

By RICHARD R. BURGESS, Managing Editor



STORM OVER LEYTE: The Philippine Invasion and the Destruction of the Japanese Navy

By John Prados. New York: NAL Caliber, 2016. 388 pp. $28.00
ISBN: 978-0-451470-361-5

The Battle of Leyte Gulf was the largest naval battle in history, but has been the subject of surprisingly few comprehensive books, perhaps because of its wide scope and the fact that it actually was four connected battles: Sibuyan Sea, Samar, Cape Engano and Surigao Strait. The clashes resulted in the sinking of a Japanese super battleship, demonstrated the courage of American destroyermen against overwhelming force, the success of a decoy operation; the first use of kamikazes and the revenge for the battleships at Pearl Harbor. The author is a first-class researcher who has mined intelligence records, as well as operational records, diaries and prisoner interrogations, and brought forth new information and perspectives into the leaders and decisions that ended the Japanese fleet's future as a formidable fighting force.

US NAVY SHIPS VS KAMIKAZES

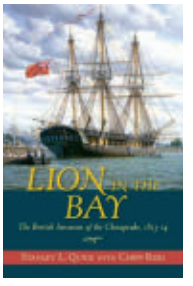
By Mark Stille. Oxford, U.K. Osprey Publishing, 2016. 80 pp. $27.00

US NAVY CARRIER AIRCRAFT VS IJN YAMATO CLASS BATTLESHIPS

By Mark Stille. Oxford, U.K. Osprey Publishing, 2015. 80 pp. $24.95
ISBNs: 978-1-4728-1273-5, 978-1-4728-0849-3

The author of these books, an expert on the Japanese Navy in World War II, brings narrative and analysis of faceoffs between two powerful navies, those of the United States and Japan, in 1944 and 1945. The Japanese kamikaze suicide aircraft campaign ultimately failed, but was the most serious and damaging threat the U.S. Navy faced in the war. It caused the sinking of 39 Allied ships, the permanent retirement of 27 others, and the deaths of more than 6,000 Sailors and Marines.

The aircraft versus battleship volume describes the successful attacks by U.S. carrier aircraft against the two Japanese Yamato-class super battleships in 1944-1945. *Musashi* was sunk by an overwhelming air attack in the Sibuyan Sea in the Battle for Leyte Gulf in October 1944, while sister ship *Yamato* survived air and naval attacks off Samar. *Yamato* eventually succumbed to massive air attack in April 1945 as it sailed in attempt to disrupt the naval forces invading Okinawa. *Yamato*'s loss signified the end of the era of the battleship in war at sea.



LION IN THE BAY: The British Invasion of the Chesapeake, 1813-1814

By Stanley L. Quick with Chipp Reid. Annapolis, Md.: Naval Institute Press, 2015. 280 pp. $32.95

WAR IN THE CHESAPEAKE: The British Campaigns to Control the Bay, 1813-1814

By Charles Neimeyer. Annapolis, Md.: Naval Institute Press, 2015. 256 pp. $44.95
ISBNs: 978-1-61251-236-5, 978-1-61251-865-7

These books, both published in 2015, cover much of the same territory in their discussion of the War of 1812 and the British attempts to control the Chesapeake Bay, with its access to the U.S. capital of Washington and the ports of Baltimore and Norfolk, Va. What began as a British reprisal for the U.S. burning of York, Canada, (present-day Toronto) turned into a major campaign to control the bay and its shores. The unreinforced Maryland and Virginia militias failed in their attempt to counter British forces at Bladensburg, Md., and they proceeded to burn Washington. The Royal Navy's bombardment of Fort McHenry in Baltimore harbor failed to crack the Americans, however, and Great Britain abandoned its plan to control the Chesapeake. The authors of both books present not just a narrative but a rich background and context of the impact of personalities and circumstances on the decisions that tacked the course of the campaign. ■

Seapower does not review works of fiction or self-published books.

Navy Leaguers Highlight Challenges, Rewards of Ship Commissionings

By PETER ATKINSON, Deputy Editor

October was a particularly busy month for Navy ship commissionings, with four, including the first-in-class guided-missile destroyer USS *Zumwalt*, joining the fleet. For Navy League members who were involved with, or presided over, the committees planning the ceremonies and events that went along with them, the commissionings capped what in some cases was several years' worth of work.

The commissionings kicked off with the ceremony for the amphibious transport dock ship USS *John P. Murtha* Oct. 8 at Penn's Landing in Philadelphia. *Zumwalt* was commissioned in Baltimore on Oct. 15. On Oct. 22, the Freedom-class littoral combat ship (LCS) USS *Detroit* was commissioned in the Port of Detroit. The month concluded with the commissioning of the Virginia-class attack submarine USS *Illinois* Oct. 29 in Groton, Conn.

Commissioning-related events and highlights ran the gamut from concurrent Fleet Week activities and a performance by The Blue Angels Navy Flight Demonstration Squadron in Baltimore to an address by U.S. House Minority Leader Nancy Pelosi, D-Calif., in Philadelphia, and Ship's Sponsor First Lady Michelle Obama giving the order to "man our ship and bring her to life" for Sailors of USS *Illinois*.

The process of putting together such a momentous occasion can be equally monumental, not only because of all that is involved with the logistics, site preparation and event planning surrounding the ceremony, but the unpredictability of the ship's construction timeline — and the Navy's schedule for accepting it and setting the official date — and, of course, the weather.

Given all that, patience, flexibility and diplomacy are key virtues when it comes to commission ceremony planning, according to John R. Peracchio, chairman of the USS *Detroit* (LCS 7) Commissioning Committee and a member of the Navy League's Metropolitan Detroit Council. The *Detroit* Committee worked for more than three years on the ship's commissioning, yet did not have a concrete date for the ceremony until late July as its delivery kept getting pushed back while design and performance issues were addressed throughout the LCS program. *Detroit* was accepted by the Navy in August.

"We have been at this a good long time," Peracchio said. "The committee worked so hard because this was such an important event for the city, and once we got the date we moved at warp speed.

U.S. NAVY

First Lady and Ship's Sponsor Michelle Obama gives the order to "man our ship and bring her to life" for Sailors of the Virginia-class attack submarine USS *Illinois* during its Oct. 29 commissioning ceremony at Naval Submarine Base New London, Conn.

"In the end, everything worked out. The ship being brought to life on the Detroit River with the General Motors building in the background was a wonderful sight to see. To have this here, for a city that is being reborn, was really special. We had a great week here in Detroit," he said.

A crowd of nearly 6,500 attended the commissioning ceremony, and many more took part in public tours of *Detroit* while it was in port. In fact, more people lined up for tours than the ship could accommodate, Peracchio said, so *Detroit*'s captain, Cmdr. Michael P. Desmond, spent time walking the line to greet visitors, pose for pictures and thank them for their good will.

The *Detroit* commissioning also was unique in that it was international in scope, given the proximity of Windsor, Ontario, Canada, across the river and the shared U.S. and Canadian responsibilities for traffic and maritime security on the Detroit River and nearby Lake St. Clair. Windsor Mayor Drew Dilkens was a member of the honorary commissioning committee and Port of Windsor Harbour Master Peter Berry was a member of the official committee. The Royal Canadian Mounted

Police Color Guard presented the colors during the commissioning and the national anthems of the United States and Canada were played.

"We had to have good cooperation for this to happen, it was truly a team effort, we planned this from the beginning with our Canadian friends," Peracchio said.

After the commissioning, *Detroit* "sailed" across the river and made Windsor its first international port of call.

The *Zumwalt* Commissioning Committee had about two years to plan the ceremony to introduce the Navy's newest class of warship to the fleet. The effort was led by retired Rear Adm. Scott Sanders, retired Rear Adm. Frank Thorp and retired Capt. Dale Lumme, president of the National Capital Council.

U.S. NAVY

Balloons fly and the crowd applauds as the guided-missile destroyer USS *Zumwalt* is brought to life during a commissioning ceremony at North Locust Point in Baltimore Oct. 15.

The committee was formed out of the Baltimore Council in fall 2014 from people who had worked on the prior commissioning there, for the guided-missile destroyer USS *Sterett* in August 2008, The co-chairmen said in a joint e-mail response to *Seapower* questions, notably retired Vice Adm. Ken Malley and Bill Devine, both longtime Navy League members and Navy veterans.

"Without their guidance and support, this huge undertaking could not have happened. The Baltimore Council formed the initial 'core' of the team in concert with the National Capital and Annapolis Councils, demonstrating how well Baltimore could support such an important event for the Navy, as well as showcasing the legacy of Adm. Zumwalt and the crew of the ship," they said.

"The committee expanded to a larger group about 15 months ahead of the ceremony once Baltimore was selected as the commissioning site."

The location of the commissioning, at the Port of Baltimore's North Locust Point, a confluence of other events in the city that weekend and the high-profile nature of many of the attendees — along with their sheer number — posed some significant challenges for organizers that continued right up to the ceremony.

"The biggest challenge was working with federal, state and local jurisdictions in working security details," the co-chairmen said. "The Department of Homeland Security classified the event as a National Special Security Event. With over 80,000 attendees for Baltimore Fleet Week, Blue Angels, Baltimore Marathon and the USS *Zumwalt* commissioning (12,000-plus attendees), the Commissioning Committee couldn't anticipate the vast security requirements from federal, state and local jurisdictions.

"Baltimore is a busy port and not knowing a date well in advance made scheduling pier space for eight straight days difficult. Having to adjust competing schedules and not knowing the specific site and date until late in the planning process is challenging, but the cooperation of the state, city, commercial entities and the Navy made this work," they added.

"We always knew that the Zumwalt name would be a big draw, especially with Adm. Zumwalt' s daughters (Ann and Mouzetta) being the ship's sponsors as well as huge supporters. *Sterett* drew 5,000 attendees, and we always expected 10,000-15,000 attendees for *Zumwalt*."

But the effort paid off, and the commissioning week events and the ceremony itself went extremely well, the co-chairmen noted.

"Most importantly, the ship and crew were recognized and honored in a way consistent with the great legacy of their namesake, Adm. Bud Zumwalt," they said. "The entire week was a great showcase for the Navy. The *Zumwalt* commissioning culminated 'Fleet Week' in Baltimore. … That, combined with two performances by the Blue Angels, really made this a spectacular week."

The *Illinois* commissioning was a similar team effort, with all five of the state's active Navy League councils getting involved, and Aurora taking the lead, retired Capt. Bobby Ferguson, a national director from the Great Lakes Region, said in an e-mail response. He served as co-chairman of the committee with Len Wass, a retired Navy submariner and Aurora Council member.

U.S. NAVY/LOCKHEED MARTIN

The crew of the Navy's Freedom-variant littoral combat ship USS *Detroit* race aboard the ship to fall into formation during the ship's commissioning ceremony Oct. 22 on the Detroit River.

The committee was formed in June 2014 and met monthly at the Union League Club of Chicago to plan the ceremony and associated events. As other committee leaders noted, waiting for the official commissioning date was perhaps the hardest part of the planning effort, Ferguson said, followed by the scramble to get everything nailed down once it was set — with the added wrinkle here of working in Illinois for an event being held in Connecticut.

"The commissioning date was made official just 10 weeks beforehand," he said. "Those 10 weeks were a big rush — getting contracts for receptions, getting coins struck, arranging for hotel rooms for guests, making transportation arrangements for donated food products, etc."

The committee also stepped in to help out McKean Defense Group LLC, which coordinated all four commissionings, by volunteering to send all tickets to the events, except the commissioning ceremony itself.

And here again, Ferguson said, "as much as we worried that everything go just right, we were very proud and pleased that virtually everything we did [which included a post-commissioning pier-side reception featuring Illinois food products, and a precommissioning New England clambake with the committee joining the crew and their families] came off exceedingly well.

"The commissioning of USS *Illinois* (SSN 786) was a smashing success. Some 3,000 people crowded onto Pier 6, with overflow on Pier 8, to witness the first Navy ship named after the great state of Illinois since 1897," he said. "Following the ceremony, [First Lady Michelle Obama] took a tour and met many of the crew.

"We derived a great deal of pleasure in bringing crew members to Illinois to show them around the state and establishing a bond with them during those visits and during commissioning week. … Seeing the public's reaction to these Sailors made it all worthwhile."

For the Philadelphia Council, and former President Tom Metzger, the *Murtha* commissioning was something of a case of déjà vu all over again. It was the second amphibious transport dock commissioning he has presided over in two years, the first being *Murtha*'s sister ship USS *Somerset* on March 1, 2014.

Once the official date for the *Murtha* commissioning was announced, Metzger said, "I called my committee from the *Somerset* and said, 'Do you want to put the band back together?' And they said, 'Sure, let's do it.'

"We didn't have a whole lot of time, we didn't get an official letter for the commissioning until late June, so it was a really quick turnaround. We took that as a challenge and said, 'The date's not going to change, let's get busy.' We put everybody together, we had a couple meetings, everyone got their marching orders and we just went at it."

On paper, the *Murtha* commissioning seemed like it would be a somewhat simpler proposition, since it was one family involved, that of its namesake, the longtime U.S. representative from Pennsylvania who was a two-time Purple Heart recipient and the first Vietnam War veteran elected to Congress.

"For the *Somerset*, we had all the Flight 93 families involved, we had the first responders, the citizens of Somerset County involved. Everyone was real intimate with that, and rightfully so," Metzger said. "Last time, we had 19 people in Philadelphia and 19 people in Somerset County because of the fundraising that was needed, we set up a satellite committee out there and they did a great job. This time we had 12 people. We kept the committee pretty lean and everyone had a specific job. We kind of knew what to expect."

Still, a couple of last-minute "unexpecteds" made for some anxious moments and additional work for the USS *John B. Murtha* (LPD 26) Commissioning Committee. The first was the prospect of the unpredictable Hurricane Matthew, which was wending its way up the Atlantic coast and threatening to put a damper on commissioning activities.

"But the weather turned out beautiful, the hurricane went out to sea, the people ended up standing on the flight deck watching the lights on the [Benjamin Franklin] Bridge and the city, it was gorgeous," Metzger said. "It was wonderful."

The second involved a reception caterer, though here too potential disaster was averted.

"We threw a reception on the Thursday prior to the commissioning. We had 700 people, the entire crew, some of their families, Navy Leaguers, local business people, and the caterer, who was going to do a Taste of Philadelphia, called up on Sunday and said he couldn't do it," Metzger said. "So I had from Sunday to Thursday to put the thing together.

"On Monday, I called someone who was recommended and he stood up and put out the most phenomenal meal I have ever seen. He had cheese steaks made to order on grills on the flight deck, hoagies made up, he had a Rita's water ice stand, he had hot roast beef sandwiches, he had hot roast pork sandwiches with all the extras, etc., and all of this was put together from Monday afternoon to Thursday.

"And, to boot, we had contacted the local USO Troupe and they sent four people down and they put on a half-hour show for us during the reception. The crew didn't want to leave."

More than 6,000 people attended the USS *John B. Murtha* commissioning.

"We love doing commissionings, I do anyway," said Metzger, a retired Navy petty officer. "In my retirement, I said I was going to support the fleet for the rest of my life and this is a great way of doing it with the Navy League."

That sentiment was echoed by the other commissioning committee leaders.

"Commissioning ships is the best experience I have had as a Navy League member," Ferguson said. "Whether I led the committee, served on the committee, or simply attended a commissioning, I came away feeling a part of the Navy, proud of our country and glad to be involved with the Navy League. I have attended 11 commissionings, and it never gets old."

"It is one of the most rewarding endeavors that you will ever be associated with," Peracchio added.

And along with Peracchio's recommendation for patience, flexibility and diplomacy when it comes to commissioning planning, the committee leaders all offered advice based on their own experiences with such events to Navy Leaguers looking to get involved in the future.

"Keep the committee lean, focus on fundraising," Metzger said. "Fundraising is the key because if you have enough money, you can do anything. No matter what problem comes up at the end, during the week that the ship is in port, if you have enough money you can fix it."

"Select committee members based on what they can contribute to the effort," Ferguson said. "Skills needed are fundraising, event planning, financial expertise, organization and public relations. … There is a lot of work to be done, so there is no room for bench sitters. Reach out to recent commissioning committees to learn from their experiences. Where possible, use a theme from the namesake of your ship to plan events around. Finally, think big!"

The *Zumwalt* commissioning leaders also suggested getting in touch with other commissioning committees for advice and support.

"The Navy League is such a great organization," they said. "When one council needs help, others consider it an 'all hands on deck' event. The Commissioning Committee also received vital lessons-learned support from the corporate knowledge subject matter expert Maryellen Baldwin (Hampton Roads Navy League icon). Additional support was received from Karen and Doug Crawford, along with retired Capt. Bobby Ferguson who … provided superb lessons-learned support in executing all aspects of ship commissioning events.

"Start early, empower the volunteer committee members, develop a great relationship with the ship's commanding officer … and be prepared for last-second surprises," the co-chairmen added. ■

In order to formalize the process and develop a resource center to assist commissioning committees, Navy League National President Skip Witunski recently formed an ad hoc committee to examine the Navy League's role in commissionings.

U.S. MARINE CORPS

Donna S. Murtha speaks during the commissioning of the amphibious transport dock ship USS *John P. Murtha* Oct. 8 at Penn's Landing in Philadelphia. The ship was named after her father, a former Marine, former governor of Pennsylvania and long-time U.S. representative from the state.

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PCU *Colorado* Culinary Specialists Get Chance to Learn from Top Chefs

By PETER ATKINSON, Deputy Editor

Two Navy culinary specialists from the Virginia-class attack submarine Pre-Commissioning Unit (PCU) *Colorado* (SSN 788) and an Air Force chef from North American Aerospace Defense Command and U.S. Northern Command recently were able expand their professional culinary skills by working with professional chefs around the state of Colorado.

As part of a week-long learning experience, **Seaman Oyedolapo Oworu** and **Seaman Thomas Carswell** apprenticed at six fine restaurants. Their enthusiastic hosts instructed the Sailors on preparing practical dishes and meals with a Colorado theme, which they can later prepare for the crew.

The visit was sponsored by the USS *Colorado* (SSN 788) Commissioning Committee and actively supported by members of the Colorado Springs and Denver Councils, according to a report from **Deborah L. Zeller**, the Colorado Springs Council vice president of Public Relations. Committee members **Candice Green** and **Shauna King** were instrumental in coordinating the crew's Colorado visit with so many remarkable chefs.

On their first stop, the culinary specialists traveled to Vail and trained under Four Seasons' **Executive Chef Marcus Stewart** and sous chefs in preparing three meals and learning how to do a spice rub.

The next day, they were accompanied by Air Force **Tech. Sgt. Patricia Harvey** and toured all of The Broadmoor's kitchens in Colorado Springs. This five-star resort's **Executive Chef Bertrand Bouquin**, a former French Navy Sailor, and his team guided the three military chefs in preparing regional foods and menus from the 1858, La Taverne and Golf Club restaurants. They developed new skills in cooking with chilies, western seasonings and specialty foods like wild boar. During their time at The Broadmoor, complete menus, menu guides and recipes were provided that encompassed the resort's diverse offerings.

USS *COLORADO* (SSN 788) COMMISSIONING COMMITTEE

Seaman Oyedolapo Oworu and Seaman Thomas Carswell, culinary specialists with the Pre-Commissioning Unit *Colorado*, receive some pointers from Executive Chef Marcus Stewart at the Four Seasons Resort and Residences in Vail, Colo. The Sailors apprenticed at six fine restaurants around Colorado during a visit sponsored by the USS *Colorado* (SSN 788) Commissioning Committee and supported by members of the Colorado Springs and Denver Councils.

The next experience for the PCU *Colorado* Sailors was working at The Brown Palace and Tom's Urban in Denver. They rotated through the restaurants' kitchens and gained added food preparation skills thanks to the head chefs. **Chef Michael Wright** of The Brown Palace provided them with 150 original Colorado recipes.

Chefs Renzo Freitas and **Irwyn Marquez** of Tom's Urban taught the culinary specialists how to modify their recipes to adapt to the submarine's kitchen equipment and needs of the crew. The military chefs found their creative hands-on experiences to be extremely valuable in supporting the morale and well-being of those they serve.

Aboard the submarine, a team of seven culinary specialists led by a chief petty officer will prepare 400 meals per day, 24 hours a day, seven days a week in a galley measuring roughly 10 by 20 feet. The future USS *Colorado* is scheduled to be commissioned next summer.

Florida Councils Mark Navy Birthday

The Mayport Council hosted the 241st Tri-Base Navy Birthday Ball at the Renaissance Hotel, World Golf Village in St Augustine on Oct. 1. The annual event combines the resources from Naval Station Mayport, Navy Region Southeast, Naval Air Station Jacksonville and Naval Submarine Base-Kings Bay, Ga., to provide a spectacular gala for the Sailors and families from each base. More than 900 people attended the event that consisted of an all-service color detail, POW/MIA Ceremony and rendered honors to each service through the rendition of the all-service medley played by the Navy Region Band. The event also recognized veterans from World War II, the Korean War, Vietnam War and the current war on terror.

The keynote speaker for the event was **Adm. Kurt W. Tidd**, commander, U.S. Southern Command, who spoke about the numerous feats of selfless acts of bravery and traditions exhibited by the Navy over the course of the service's 241 years and provided a detailed description of the heroic actions of some of the Sailors in battle. Additionally, Tidd administered the Oath of Office to 11 new Navy recruits and discussed the origins and importance of the oath. The audience gave numerous standing ovations.

JACEK GANCARZ

Retired Vice Adm. Al Konetzni was the guest of honor and speaker at the Palm Beach, Fla., Council's Navy birthday celebration Oct. 15 at the Sailfish Club.

The Navy Ball Committee consisted of **John Vargo**, **Tom McLaughlin**, **Darrell Long**, **Peggy Warner**, **Bill Sekeres**, **Bill Dudley** and numerous representatives from each Navy base.

More than 150 members of the Palm Beach, Fla., Navy League family gathered at the Sailfish Club in Palm Beach Oct. 15 to celebrate the 241st birthday of the U.S. Navy in grand style. In addition to Palm Beach Council members, the gathering was joined by U.S. Naval Sea Cadet Corps (NSCC) cadets, Young Marines, Navy Junior Reserve Officers Training Corps (JROTC) cadets, and Navy Reserve officers and Sailors from Navy Operational Support Center, West Palm Beach.

The evening's guest of honor and speaker was retired **Vice Adm. Al Konetzni**, one of the most popular and influential submarine admirals of the past 20 years, according to report from Council **President Ken Lee**. His enthusiasm for today's young Sailors and cadets was obvious as he spent much of the evening talking to them and about them.

Lee introduced Konetzni for his keynote speech and presented him with a Palm Beach Council challenge coin and a Navy League desk compass. The Color Guard was provided by the Young Marines of the Palm Beaches and **Sea Cadet James Thomas** led the singing of the national anthem. The cutting of the ceremonial cake was by four

JACEK GANCARZ

Astronaut Bob Crippen, pilot of the first orbital test flight of the Space Shuttle program and commander of three Space Shuttle missions, stands with Young Marines during the Palm Beach Navy birthday celebration.

World War II Navy veterans, the youngest Navy Reserve Sailor and the youngest cadet in attendance.

"This birthday party was everything we wanted it to be," Lee said. "Patriotic, inspiring and great fun."

Long Island Honors Retiring Rep. Israel

Retiring **U.S. Rep. Steve Israel**, D-N.Y., was recognized by the Long Island Council for his long support of the armed services and veterans during an Aug. 30 cocktail reception at the Melville Marriott Hotel, Melville, N.Y. Council **President John Beal** acknowledged the congressman's commitment to the maritime services. **Awards Chairman Walter Poggi**, president of corporate member Retlif Testing Laboratories, assisted with presenting the awards, one of which was the Nassau County Executive Citation and the other from the council.

The reception featured an address by Israel, who discussed the vital role that maritime services continue to play in safeguarding and maintaining movements of commercial cargo, military per-

Retiring U.S. Rep. Steve Israel, D-N.Y., receives plaques from Long Island Council Awards Chairman Walter Poggi to recognize him for his support of the armed services and veterans during nearly two decade in Congress.

KENNETH J LEE

Richmond, Va., area Sailors, Marines and Coast Guard members gather during the Richmond Council's annual Sea Services Luncheon on Oct. 12 at Willow Oaks Country Club.

sonnel and equipment around the globe. He also commended the efforts of all military veterans who have honorably served.

Israel has represented New York's 3rd Congressional District, which encompasses portions of Nassau and Suffolk Counties on Long Island, since 2000. A member of the House Appropriations military construction, veterans affairs and related agencies subcommittee, he did not seek re-election this year.

Among those joining council members to honor Israel at the event were a variety of military members, and representatives of corporate sponsors Curtiss Wright Flow Control, Telephonics and Retlif Testing Laboratories. Beal was assisted in the coordination of the reception by **Tom Matteo**, the council's secretary/treasurer.

Richmond Council Hosts Sea Services Luncheon

The Richmond, Va., Council hosted its annual Sea Services Luncheon on Oct. 12 at Willow Oaks Country Club. Guest speaker, **Cmdr. Ted Carlson**, was joined by Marine Corps **Capt. Keith Lowell** and Coast Guard **Cmdr. Marc Brandt**, each with their respective ceremonial swords, in a cake-cutting ceremony as the luncheon got under way.

Each October, the Richmond Council takes pride in honoring the Sailors aboard its four adopted ships; the guided-missile destroyer USS *Gravely*, guided-missile cruiser USS *Normandy*, dock landing ship USS *Carter Hall* and Coast Guard Cutter *Northland*, in addition to the recruiters of Naval Recruiting District-Richmond, Marine Corps and Coast Guard, and other local military commands

Carlson, commanding officer of USS *Gravely*, gave an excellent summary of the ship's eight-month deployment to the Middle East, accompanied by a PowerPoint presentation, followed up with a question-and-answer session.

Western Connecticut Holds SEAL Picnic

The Western Connecticut Council held its SEAL Picnic on June 18 at Pugzee's Farm in Washington, Mass. The farm is owned by **Eyal Shapiro**, a strong supporter of the local Recruiting District Assistance Council SEAL Candidate mentoring program, according to a report in the October issue of the council's newsletter *The Helm*.

Shapiro's farm has an obstacle course fashioned after the course used at the Basic SEAL Training (BUDS) program, that all candidates must pass to become SEALs. He also has hosted a number of generous programs for veterans and their families.

Capt. Drew Bisset leads the local SEAL candidate mentoring program and is a council board member. His program has had a remarkable success rate in getting candidates through the famously rigorous SEAL training.

At the picnic, there was a moving unveiling of a memorial dedicated to those lost when their Chinook helicopter was shot down in Afghanistan in August 2011. All 38 people aboard the helo were killed, including 25 American special operations personnel, in the single deadliest incident in the Afghanistan campaign. Pugzee's Farm includes a refurbished Chinook fuselage.

A month earlier, the Western Connecticut Council merged with the Bridgeport Council and welcomed its 37 active members aboard.

There is strength in numbers in engaging local and national Navy League mission, according to the newsletter. This merger leaves

Connecticut with three Councils: Eastern Connecticut, based in New London, Hartford, and the Western Connecticut Council.

With the merger of the Bridgeport Council, Western Connecticut added another NJROTC unit to its area of coverage. The Bridgeport Military Academy, started in 2013, is a public city charter school with a highly active NJROTC unit consisting of 330 cadets. Senior unit Naval Science Instructor is retired Navy **Capt. Bill Glass**. The two other NJROTC units in the area are at Bethel and Brien McMahon high schools.

Fort Lauderdale, Broward Salute Sea Cadets

The Broward County, Fla., Council joined with the Fort Lauderdale Council for a Sea Cadet Night Sept. 21 at the Coral Ridge Yacht Club as part of the Navy League's annual Naval Sea Cadet Corps Month.

During the event, five outstanding cadets from the Spruance Division gave presentations on their summer training experiences. **Cadet Gabriel Green** also was presented with the Navy League's Youth Award, also known as the Teddy Roosevelt Medal. The event featured the Spruance Division Sea Cadets Color Guard and included guests from local Coast Guard units and congressional staffs, according to a report in the October issue of Broward County's newsletter, *The Helmsman*.

The cadets who offered summer training presentations were **Alec Cooper**, **Jake Scheiner**, **Jonathon Pyne**, **Mathew Tibbetts** and **Blake Gamboa**. Spruance Division Commanding Officer **Lt. Cmdr. Alan Starr**, NSCC, also spoke about the training programs the cadets attended over the summer.

Green was presented the Youth Award by Starr, Fort Lauderdale Council **President Oscar Romano** and Coast Guard Station Fort Lauderdale Commanding Officer **Lt. Mark Ketchum**.

It was clear to everyone in attendance that these six cadets are the future leaders of the country, according to the newsletter report.

MARIANNE GIAMBRONE

Spruance Division Sea Cadets Jonathan Pyne, Jake Scheiner, Mark Tibbetts, Blake Gamboa and Alec Cooper stand with Division Commanding Officer Lt. Cmdr. Alan Starr (NSCC) during the Fort Lauderdale Council's Sea Cadet Night event Sept. 21 at the Coral Ridge Yacht Club.

Navy League Approves Todd as President-Elect

David N. Todd, Ph.D., was approved by the Navy League Board of Directors to be president-elect during the Nov. 10 board meeting at the Conference Center at the Maritime Institute in Linthicum, Md.

Todd will succeed **National President Skip Witunski** at the Annual Meeting of Members during the Navy League's National Convention June 20-24 in Milwaukee.

Todd joined the Navy League in 1987 and has served as a national director for 15 years and national vice president for five years. A member of the Portland, Ore., Council, he has had leadership roles at every level of the 114-year-old organization.

Along with his years of Navy League experience, he also has a background of extensive nonprofit volunteerism and management, and broad experience in government, the military, business and education.

He served in the U.S. Navy as a surface warfare officer, with active-duty tours including staff duty with U.S. Navy Forces Europe and shipboard deployment to Western Pacific operational areas during the Vietnam era. His Reserve service spanned 23 years, and his assignments included Military Sealift Command, surface combatant and auxiliary shipboard units, an amphibious Seabee construction battalion, Reserve Readiness Command staff and joint Navy-Coast Guard Maritime Defense Zone staff. He retired as a captain.

Todd is a faculty member at Mt. Hood Community College, teaching computer science, and is an adjunct assistant professor of Management and Technology for Embry-Riddle Aeronautical University-Worldwide.

COURTESY OF RON BROOKS

Members of the Greater Kansas City Council gather in front of the Lamp of Learning at the Lewis and Clark Building that houses the Navy Element at Fort Leavenworth, Kan., during an Oct. 20 visit.

Greater Kansas City Members Visit Fort Leavenworth

Members of the Greater Kansas City Council took a field trip to the Fort Leavenworth, Kan., instead of holding a regular meeting on Oct. 20 to learn the history of the post from a member of the Army command and General Staff College History Department faculty.

The 24-member group then toured the post by bus, was briefed by the director and staff of the Navy Element and finally enjoyed a late lunch at the Solarium Buffet in the Freedom Center, according to a report from Council **President Rob Brooks**. It was good fall weather and a great day, he said. ■

Editor-in-Chief Amy L. Wittman contributed to this report.

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Lt. Cassie Redner

Anti-Submarine/Anti-Surface Warfare Tactics Instructor
Naval Surface and Mine Warfighting Development Center Sea Combat Division
San Diego

U.S. NAVY

Lt. Cassie Redner showcases the Warfare Tactics Instructor (WTI) badge she received upon graduating from the Naval Surface and Mine Warfighting Development Center (SMWDC) April 12. Redner and Lt. Solomon Lu, right, were two of the first 12 surface warfare officers to graduate from SMWDC's intensive anti-submarine/anti-surface WTI course at Naval Base Point Loma, Calif.

I am originally from Allendale, Mich. I joined the Navy on Feb. 2, 2002. I was going to complete medical school and I wanted become a pediatrician. However, joining the military was always on my bucket list. If I waited until after school and became busy with my career, then I might not actually have had the chance to serve my country — so I went with my heart and joined the Navy.

I was going to come in as a corpsman and go to "A" school; however there a 12-month delay. I wanted to join early, so I opted for deck seaman because I knew my options for cross-rating would be valuable, and I could see different rates and make an educated decision for the best rate for my career. It was a case of choose your rate — choose your fate.

I cross-rated to operational specialist after a year of deck department, and soon became an operations specialist first class petty officer, and later transferred to ATG [Afloat Training Group]. Toward the end of that tour, I put in my packages for Officer Candidate School. I was accepted and I transferred to Newport, R.I., to fulfill my commissioning process in October 2010. I was commissioned as an ensign/surface warfare officer [SWO] in January 2011.

Being a SWO means simply learning from doing. My education has little to do with my profession as my degree is in psychology, with a specialty in neuropsychology. I pursued my education while in the Navy, during off-duty hours. I felt that I didn't want to come into the Navy thinking that it, A, was going to be a full-time career or, B, what if I wanted to do my four or six years and separate to satisfy other life goals?

I learned something within my first two years in the Navy. I discovered that I absolutely loved it. I love the drive — the ambition — the pace and learning something new at each duty station.

I really enjoyed the operations specialist realm, it was very tactically involved. You're always in the combat information center on the ship — the brain. And I became an air intercept controller and a tactical datalink coordinator as well while I was enlisted. It was a lot of fun.

Once commissioned, it got even better. I went to USS *Stockdale* and became the strike officer onboard, as well as the legal officer. I then fleeted up there, which meant I stayed onboard the ship, and became the anti-submarine warfare officer.

I did my second division officer tour there, finished my qualifications and then headed to the Anti-Submarine/Anti-Surface [ASW/SUW] Warfare Tactics Instructor [WTI] course at SMWDC [Naval Surface and Mine Warfighting Development Center, which opened in San Diego, June 9, 2015.]

We were "the dirty dozen" — the first ASW/SUW WTIs. We graduated in April. Our second group of ASW/SUW WTIs graduated in November. SMWDC has now graduated more than 100 WTIs in the surface warfare community across three discipline areas: Amphibious Warfare, ASW/SUW, and Integrated Air and Missile Defense.

Our program is unique in a sense that, yes, you are an instructor, a teacher and a mentor, yet you also have to be productive within the fleet. I'm currently the ASW instructor at SMWDC's Sea Combat Division where we teach future WTIs and future anti-submarine officers. As many of us [WTIs] are fulfilling roles as the teachers, we're simultaneous looking at advancing capabilities. We're very involved with the teaching and

injected into the building of software and equipment, and going out and actually making sure that they [surface warriors] are tactically ready to employ their weapons systems if called upon.

It's a challenging field, it's fast-paced. Most fields or communities you work with, they are very specific and pipelined toward one specific platform, one specific goal or objective. For us, as surface warfare officers, we get to merge not only with different entities inside the fleet — submarine community, aviation community — we also get to merge with different forces. We integrate with Marines. We also work with the Army and the Air Force. It's a very diverse community.

I consider myself a high-velocity instructor with what we're doing to support the Surface Navy. We are not relying so much on what we've learned in the past; we have the ability to go and test new things and try new things and promote our fleet to be on the forefront. That's what's most rewarding — to being able to say, "Hey, every day I can go out there and improve the Navy in one facet or another," whether it's something small or something major.

You never want to think anything bad can happen, but you never know and you always want to be prepared. As an instructor, and being able to go out and support events in SWATT [Surface Warfare Advanced Tactical Training], it's helping support our maritime superiority and being able to lead from the front, and to get not only the surface force, but all Navy forces on the same page.

I'm definitely going to finish here at SMWDC's Sea Combat Division, then I'll move to department head school. After department head, I am eligible for retirement because of my prior enlisted service. However, I am going to continue on hopefully to become an executive officer and a commanding officer of a DDG [guided-missile destroyer], and then hopefully a CG [guided-missile cruiser] for a major command. So, definitely long-term — I love it.

I do have a family and 7-year-old daughter, so that plays into my career decision making, but I like to think that I am a good female role model for her and being able to allow her to see that mom is actually doing something good, not only for her but everyone else. I believe if you can see it, you can be it. ■

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